DOCUMENT RESUME

ED 185 358 CE 024 868

TITLE Gardening and Groundskeeping: A Series of Learning Activity Packages. Volume I: Learning Activity Packages 1-42.

INSTITUTION Clemson Univ., S.C. Vocational Education Media Center.; South Carolina State Dept. of Education, Columbia. Agricultural Education Section.

PUB DATE 79

NOTE 182p.; For a related document see ED 181 268.

EDRS PRICE MF01/PC08 Plus Postage.

DESCRIPTORS Agricultural Education; Behavioral Objectives; Fertilizers; *Groundskeepers; Herbicides; High Schools; Horticulture; Insecticides; Learning Activities; Learning Modules; Maintenance; *Ornamental Horticulture; Planning; Plant Identification; Postsecondary Education; Supervision; Vocational Education

ABSTRACT

These forty-two learning activity packages, intended for student use, are based on a catalog of performance objectives, criterion-referenced measures, and performance guides for gardening-groundskeeping developed by the Vocational Education Consortium of States (V-TECS). They are organized by four areas of instruction: Organizing and Planning (personnel consideration, planting and fertilization schedules); Directing and Implementing (safety and inspection activities, replacement ordering); Inspecting and Evaluating (soil sampling, storage procedures, equipment capability evaluation); and Maintaining Plants (general plant care, including planting, pruning, watering and insect protection. Each package has the same format: Introduction; Directions to the Student, Objective(s); Learning Activities; Safety; Equipment, Tools, and Supplies Needed; Instructions; Student Self-check; Final Check-out Activity; and Instructors Final Checklist. It is noted that references listed or appropriate substitutes are essential, since the learning packages as presented do not include complete content. (Volume II contains packages 43-84--see Note.) (MEK)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

CE 645

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

GARDENING AND GROUNDSKEEPING

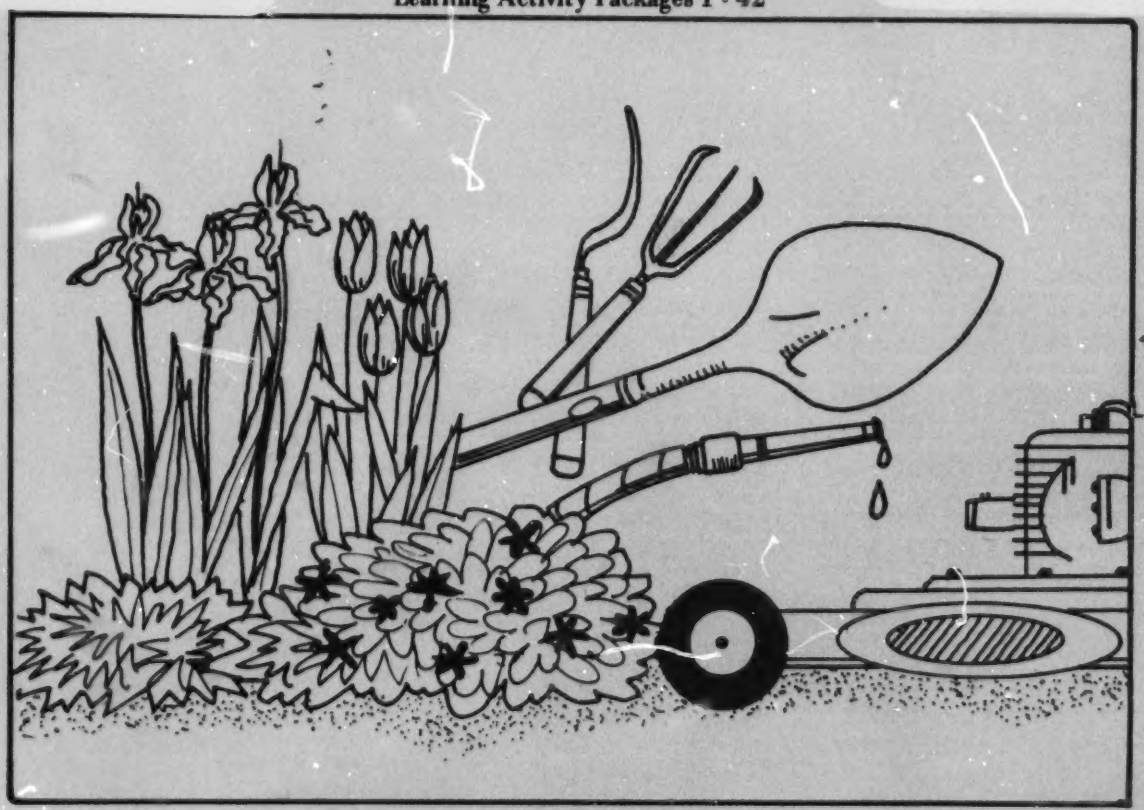
"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

E. L. Knight

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

A Series of Learning Activity Packages

Volume I
Learning Activity Packages 1 - 42



State Department of Education
Office of Vocational Education
Agricultural Education Section
Columbia, South Carolina 29201

In Cooperation With

Vocational Education Media Center
Clemson University
Clemson, South Carolina 29631

© Copyright 1979 South Carolina Department of Education

INTRODUCTORY STATEMENT

These learning activity packages are based on a catalog of performance objectives, criterion-referenced measures and performance guides for gardening-groundskeeping developed by the Vocational Education Consortium of States (V-TECS). The learning activity packages follow a typical format:

Introduction
Directions to the Student
Objective(s)
Learning Activities
Safety
Equipment, Tools, Supplies Needed
Instructions
Student Self-Check
Final Check-Out Activity
Instructor's Final Checklist

In most cases they are not content complete, i.e., they do not contain all of the information or instructions necessary to complete the task. They do, however, refer the student (very specifically) to such content. The references listed are therefore essential. Alternative references are usually listed and finally a blank line is left for the instructor to place an additional alternative reference available to the student. A listing of all publications referred to in these packages is listed on the last page.

This publication will be printed in two volumes to provide greater flexibility in use. Master copies of the Student Self-Checks and Instructor Final Checklists will be printed and provided to the instructor for recording student responses. Students should be reminded that they are <u>not to write on</u> any part of the learning activity packages.

MAY 9 1980

ACKNOWLEDGEMENTS

Grateful appreciation is extended to the following persons who contributed to the development of these learning activity packages:

The writers were:

Mr. J.C. Gibson
Former Teacher of Agriculture now with the State Department of Education, Division of Vocational Education

Mr. R. P. Smoak
Teacher of Agriculture, Rock Hill Career Development Center (retired)

Mr. R. C. Chastain
Teacher of Agriculture, Greer High School

Mr. John D. Bonnette
Finklea Career Center, Loris, S.C.

Mr. Hugh P. McClimon, District Consultant of Agricultural Education, coordinated the development of these learning activities.

Illustrations were prepared by R. D. Mattox, Art Director, Vocational Education Media Center, Clemson, South Carolina. Editing was by Mrs. Joyce Farr and typing by Kathy Murdoch of the Vocational Education Media Center.

The final copy was edited by Dr. R. J. Mercer, Vocational Instructional Materials Specialist, Vocational Education Media Center, Clemson, South Carolina.

GARDENING AND GROUNDSKEEPING

Volume I
Learning Activity Packages 1 - 42

Number

Organizing and Planning

Determining Personnel Requirements For Groundskeeping 1
Developing Priority Schedules For Completing Groundskeeping Tasks 2
Assigning Tasks To Groundskeeping Crews 3
Developing Fertilization Schedules 4
Compiling Information For Purchasing 5
Establishing Performance Standards 6
Developing Procedures For Improving Soils 7

Directing and Implementing

Establishing Safety Regulations 8
Directing Inspection Activities 9
Ordering Replacements 10

Inspecting and Evaluating

Take and Send Soil Samples 11
Evaluate Procedures For Storage Of Items 12
Evaluating Capabilities Of Equipment 13

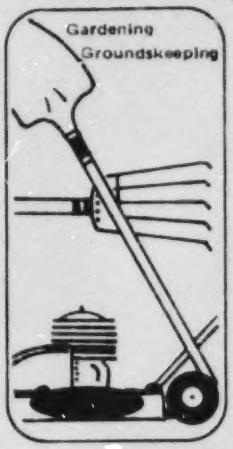
Maintaining Plants

Watering Plants 14
Planting Annual Flowers 15
Transplanting Bulbs 16
Checking Plants For Insects 17
Building Supporting Structures For Training Vines 18
Constructing Covers To Protect Plants 19
Identify Flammable Chemicals 20
Storing Agricultural Chemicals 21
Applying Chemical Treatments To Diseased Plants 22
Applying Chemical Treatments To Plants Infested With Insects 23
Applying Weed Killing Compounds To Lawns With A Compressed-Air Sprayer 24
Applying Weed Killing Compounds To Lawns 25
Adding Mulch To New Seedlings 26
Removing Grass From Flower Bed Edges 27
Filling Holes or Depressions In Lawn 28
Sodding Worn Spots In A Lawn 29
Transplanting Trees 30
Bracing Newly-Planted Trees 31
Pruning and Trimming Trees 32

Maintaining Plants (cont'd.) **Number**

Pruning and Trimming Shrubs 33
Pruning Shrubs 34
Pruning Hedges 35
Applying Tree Paint To Tree Wounds 36
Training Plants and Shrubs 37
Bracing Overloaded Limbs or Branches 38
Wrapping Trees or Shrubs To Protect From Weather 39
Treating Cavities In Trees 40
Girdling Trees 41
Removing Dead or Unwanted Trees 42

Learning Activity Package No. 1



DETERMINING PERSONNEL REQUIREMENTS FOR GROUNDSKEEPING

Objective No. 3

Ornamental Horticulture

INTRODUCTION

Determining how many workers to assign to a particular groundskeeping task to get the job done in a certain length of time can be important. For example, you may wish to prevent tieing up the use of expensive specialized equipment; other essential tasks may depend on the completion of this first job; or scheduling transportation to the job site might require getting the task completed by a certain time. In order to determine the number of persons needed for a task to complete it in a specific period of time requires certain simple mathematical calculations. In this exercise you will practice making the basic calculations necessary for figuring personnel requirements in groundskeeping.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given the length of time required for one man to mow an area 250' x 75' (76.2 x 22.9 m), determine how long it will take three men to mow an area twice this size.

LEARNING ACTIVITIES

1 READ the Instructions.

2 COMPLETE the worksheet.

3 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

4 ARRANGE with your instructor to complete this package by going through the Check-Out Activity.

SAFETY

Not applicable

TOOLS AND EQUIPMENT

None

MATERIALS

None

INSTRUCTIONS

DETERMINING PERSONNEL REQUIREMENTS

Using the steps listed below, practice determining personnel requirements.

1. List the number of hours required for one man to mow a lawn.

   A _____

2. List the relative size of the lawn area to be mowed. (For example, if the lawn area to be mowed is twice as large, list 2; if 5 times as large, list 5; etc.)

   B_____

3. Multiply A by the relative size of lawn area to be mowed (B).

   C_____ (A x B)

4. List the total number of men to be used.

   D_____

5. Divide C by D to determine the number of hours required using a given number of men.

   E_____ (C ÷ D)

EXAMPLE

Problem

If it takes 1 man 15 hours to mow a lawn of a given size, how long will it take 5 men to mow a lawn 3 times as large?

Solution

A = 15 (hours/one man)
B = 3 (relative size factor)
C = 45 (A x B)
D = 5 (number of men)
E = 9 (C ÷ D)

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

The following self-test questions can serve as a guide in determining your familiarity with the basic mathematics needed in calculating the performance objective; if you have difficulty in solving the problems you should obtain a basic math text and review any parts where you have trouble:

1. If it takes one man four hours to hand rake a 4,000 sq. ft. (371.6 sq. m) area, how long will it take two men to rake an area of 6,000 sq. ft. (557.4 sq. m)?

2. A lawn 25' x 80' (7.6 x 24.4 m) contains how many sq. ft. (sq. m)?

3. If grass seed is to be planted at the rate of 5 lbs. per 1,000 sq. ft. (92.9 sq. m), how many lbs. of seed would be needed to sow an area 60' x 200' (18.3 x 61 m)?

4. If one two-man crew can plant 36 doz. bedding plants in four hours, how long will it take two crews to plant 45 doz. plants?

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Using the sample personnel requirement information stated below, determine the personnel required.

It takes one man five hours to mow a lawn area 250' x 75' (76.2 x 22.9 m). How many hours will it take three men to mow an area twice this size? You may use a math text as a reference.

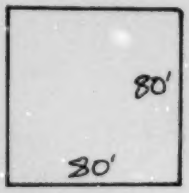
CORRECT RESPONSES

1. 3 hrs. 2. 2,000 3. 60 4. 2½ hrs.

WORKSHEET

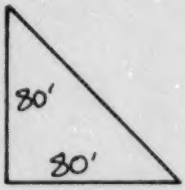
DO NOT WRITE ON THIS SHEET

Exercises in figuring areas: (diagrams not to scale) –



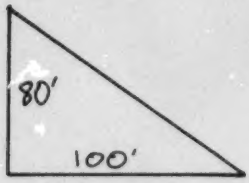
1. Area: sq. ft. (sq. m)

_____



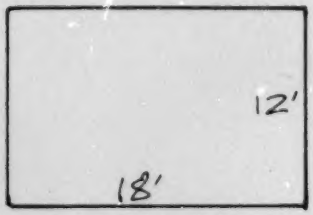
2. Area: sq. ft (sq. m)

_____



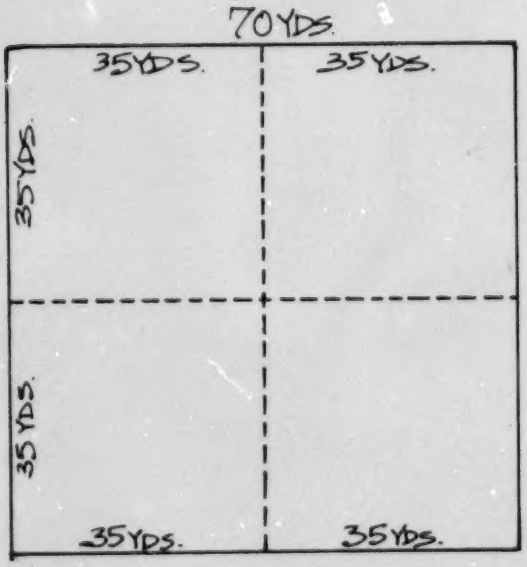
3. Area: sq. ft. (sq. m)

_____



4. (a) No. plants needed to plant 12' x 18' (3.7 x 5.5 m) area if spaced 3' (.9 m) apart each way: _____

   (b) No. plants needed to plant 12' x 18' (3.7 x 5.5 m) area if spaced 1' (.3 m) apart each way: _____



5. The "Farm Rule" on figuring acreages states that one acre square measures 70 yds. x 70 yds. (64 m x 64 m). This "Farm Rule" is accurate enough for figuring acreages in many applications. Using these measurements as a handy guide in the example diagramed to the left, calculate the following:

   (a) One acre, square, contains sq. yds. (sq. m) _____

   (b) One-half acre is ___ yds. (m) long x ___ yds. (m) wide

   (c) One-fourth acre is ___ yds. (m) x ___ yds. (m)

DO NOT WRITE ON THIS SHEET

LAP 1

Student _____

Date _____

DETERMINING PERSONNEL REQUIREMENTS FOR GROUNDSKEEPING

Instructor's Final Checklist

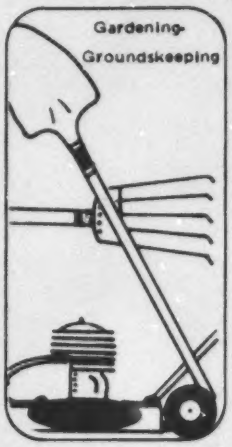
Check the student's performance in the following elements of determining personnel requirements for groundskeeping.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Answered practice exercises on the Work Sheet correctly.	[ ]	[ ]	[ ]	[ ]
2. Calculated the correct number of hours needed to solve the performance objective.	[ ]	[ ]	[ ]	[ ]
3. Made neat calculations in writing.	[ ]	[ ]	[ ]	[ ]
4. Arrived at answer logically.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 2



DEVELOPING
PRIORITY SCHEDULES
FOR
COMPLETING GROUNDSKEEPING
TASKS

Objective No. 4

Ornamental Horticulture

INTRODUCTION

A groundskeeper's job usually consists of a variety of tasks and skills. This variety of tasks carried out by a groundskeeper or landscape gardener helps make the job more interesting. But, if these various tasks are to be efficiently carried out and some essential tasks not overlooked, a plan or schedule must be followed. This schedule should include a priority of tasks. This means simply, "putting first things first". In this learning activity package you will learn how to make a groundskeeper priority schedule giving "top priority" to the essential or more important tasks.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Provided a description of tasks to be performed during one week and a prepared schedule form, develop a priority schedule for completing these tasks. The order of priorities and the clarity of the written information will be checked for accuracy by the instructor.

LEARNING ACTIVITIES

1 READ the instructions.

2 STUDY the list of tasks to be performed (Instruction Sheet I).

3 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

4 FILL IN the blank form, *Groundskeeping Job Schedule* (Instruction Sheet II).

4 ARRANGE with your instructor to complete this package by going through the Check-Out Activities listed.

SAFETY

Not applicable

TOOLS AND EQUIPMENT

None

MATERIALS NEEDED

None

INSTRUCTIONS

DEVELOPING PRIORITY SCHEDULES FOR COMPLETING GROUNDSKEEPING TASKS

(1) Review tasks to be performed (Instruction Sheet I).

(2) Review schedule form (Instruction Sheet II).

(3) Place tasks in order of priority, indicating alternatives in case of negative weather conditions.

(4) Indicate person responsible for performing each task.

(5) Indicate date of performance of each task.

(6) Present schedule to instructor.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

DEVELOPING PRIORITY SCHEDULES FOR COMPLETING GROUNDSKEEPING TASKS

Answer the following:

1. If disease or insects are found on ornamental plants it is important to apply control measures before the disease or insect infestation can become more extensive.

   True_____False_____

2. Grass should be cut as soon as needed because if allowed to grow so tall that mowing removes more than 1/4 - 1/3 of the total leaf surface, injury to the remaining grass may result.

   True_____False_____

3. The application of fertilizer to trees, shrubs, or lawns can be delayed a few days without serious results.

   True_____False_____

4. Annual bedding plants should be planted as soon as possible after danger of frost is over in order to establish them before hot, dry weather and so they can furnish a longer blooming season.

   True_____False _____

5. Grass and weeds should not be allowed to become established in flower beds as the longer they remain the more labor it takes to control them and damage to the cultivated plants is multiplied.

   True_____ False_____

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Develop a priority schedule for completing groundskeeping tasks.

CORRECT RESPONSES

1. True 2. True 3. True 4. True 5. True

TASKS TO BE PERFORMED

(To aid in developing the order of priority of tasks, consider these as tasks for the first week in May, with two men, each working five 8-hour days). (You may also consider that all tasks listed, while not of equal importance, are current problems needing completion as soon as possible).

Estimated Man-Hours Needed to Complete	Task
1	Develop fertilization schedules
3	Order replacements for plants, equipment, and supplies
6	Apply chemical treatments to diseased plants
6	Apply chemical treatments to plants infested with insects
4	Fill in holes or depressions in lawns
6	Prune shrubs (spring-flowering shrubs, after flowering)
6	Prune hedges
10	Mow grass with a rotary mower
1/2	Lubricate a tractor
1/2	Change engine oil
3	Clean and sharpen hand tools
8	Remove weeds and grass from flower beds (perennial flowers)
5	Apply fertilizer with centrifugal spreader (lawn area)
8	Plant annual flowers (bedding plants in containers)
5	Apply fertilizer to trees by the "punch bar" method
8	Construct a fence

DO NOT WRITE ON THIS SHEET

INSTRUCTION SHEET II

GROUNDSKEEPING JOB SCHEDULE

Week of _____

Day Date	Task (Job)	Alternative for Inclement Weather	Responsible Person
Mon. _____			
Tue. _____			
Wed. _____			
Thurs. _____			
Fri. _____			
Sat. _____			

DO NOT WRITE ON THIS SHEET

LAP 2

Student _____

Date _____

DEVELOPING PRIORITY SCHEDULES FOR COMPLETING GROUNDSKEEPING TASKS

Instructor's Final Checklist

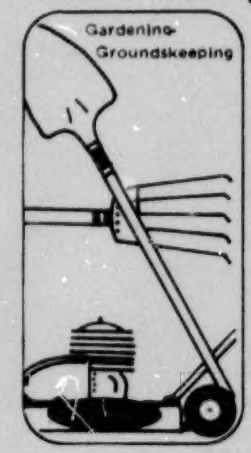
Check the student's performance in the following elements of developing priority schedules for completing groundskeeping tasks.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Listed tasks in order of priority.	[ ]	[ ]	[ ]	[ ]
2.	Gave alternatives in case of inclement weather.	[ ]	[ ]	[ ]	[ ]
3.	Indicated the person responsible for performing each task.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 3



ASSIGNING TASKS
TO
GROUNDSKEEPING CREWS

Objective No. 2

Ornamental Horticulture

INTRODUCTION

The ability to communicate ideas or directions to fellow employees is necessary every day in groundskeeping jobs. For example, you may be given instructions regarding a task, and then have to pass these instructions on to others assigned to work with you. And in a leadership position such as supervisor or crew chief there would be many occasions necessitating your giving instructions to other employees. But to get your ideas or directions across to another person is sometimes difficult. (Have you ever tried to give directions to someone trying to find a certain address or location?) In this learning activity package you will obtain practice in the oral communication of instructions to others by assigning groundskeeping tasks to fellow workers.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given three groundskeeping workers, a Bermuda grass lawn area, one self-propelled reel-type mower and two hand-type rotary mowers, assign a lawn-mowing task to each worker. The clarity of the assignment will be judged by having each worker repeat orally the assigned task and the procedures that will be followed in completing the task.

LEARNING ACTIVITIES

1 READ *An Introduction to Agricultural Business and Industry* Weyant/Hoover/McClay, pp. 71-75.

or

2 READ *Operating Instructions* section or the *Operator's Manual* for all lawn mower types which will be used.

or_____

3 READ the Instructions.

4 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Observe all safety precautions for mower operation.

EQUIPMENT NEEDED

1. 1 self-propelled reel-type lawn mower
2. 2 hand-type rotary mowers
3. box-end or open-end wrenches to adjust wheel heights

MATERIALS NEEDED

1. safety-type gas can with gas
2. motor oil for mowers

INSTRUCTIONS

ASSIGNING TASKS TO GROUNDSKEEPING CREWS

(1) Review cutting height requirements of fine grass to be cut.

(2) Review operating instructions for mower to be used.

(3) Assign lawn mowing equipment to each worker.

(4) Designate lawn areas to be mowed by each worker.

(5) Instruct workers in methods and procedures to be followed in mowing lawn areas to uniform height, and without damaging surrounding trees and ornamental plants.

(6) Arrange for equipment to be serviced and fuel tanks filled before they leave the equipment storage area; also that spare fuel is carried to complete the job, if necessary.

(7) Emphasize all necessary safety precautions in mower handling and operation.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

ASSIGNING TASKS TO GROUNDSKEEPING CREWS

Answer the following.

1. If favoritism is shown to one employee, what would probably be the attitude of the other workers?

   (a) indifference
   (b) resentment
   (c) pleasure
   (d) no reaction

2. When you show consideration or awareness of worker's feelings, this would be considered as

   (a) thoughtless
   (b) undiplomatic
   (c) rude
   (d) tactful

3. When making assignments, a knowledge of the correct names for equipment, plants, or common products would be

   (a) of little importance
   (b) slightly helpful in communicating
   (c) very helpful in communicating
   (d) the responsibility of only the owner or manager

4. In mowing slopes, the direction of travel for the mower should be

   (a) across the face of the slope
   (b) up and down the slope
   (c) either direction
   (d) all of the above

5. Before inspecting, repairing, or cleaning a power mower, after all moving parts have stopped, the operator should

   (a) drain the gas tank
   (b) tighten all nuts, bolts, and screws
   (c) clean the air filter
   (d) disconnect the spark plug wire and keep it away from the plug

CORRECT RESPONSES

1. (b) 2. (d) 3. (c) 4. (a) 5. (d)

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, ASSIGNING TASKS TO GROUNDSKEEPING CREWS.

Assign Bermuda grass lawn mowing tasks to three workers.

DO NOT WRITE ON THIS SHEET

LAP 3

Student _____

Date _____

ASSIGNING TASKS TO GROUNDSKEEPING CREWS

Instructor's Final Checklist

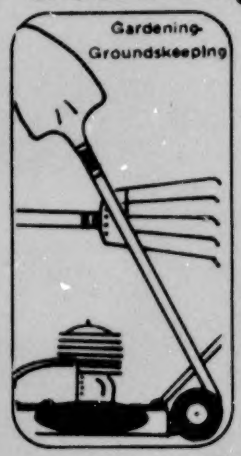
Check the student's performance in the following elements of assigning tasks to groundskeeping crews.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Assigned areas to each worker.	[ ]	[ ]	[ ]	[ ]
2. Provided for proper height of cut to be made.	[ ]	[ ]	[ ]	[ ]
3. Provided proper equipment preparation and care.	[ ]	[ ]	[ ]	[ ]
4. Stressed pertinent safety measures.	[ ]	[ ]	[ ]	[ ]
5. Asked each worker to orally repeat his/her assigned task.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.4



DEVELOPING

FERTILIZATION

SCHEDULES

Objective No. 5

Ornamental Horticulture

INTRODUCTION

In gardening and groundskeeping the proper application of fertilizer materials is essential to the health, growth, and beauty of shrubs, trees, and lawns. Proper application of fertilizers includes correct timing of application. Correct timing helps insure satisfactory results and prevents costly fertilizer waste. To insure the correct timing of fertilizer applications, the landscape gardener or groundskeeper should have a fertilization schedule. In this learning activity package you will learn how to make a schedule for applying fertilizer to shrubs, trees, and lawns.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Provided with a description of a landscaped area, a soil analysis report, and schedule form, develop a schedule for applying fertilizer to shrubs, trees, and lawns during a one-year period. The schedule will be checked for accuracy by the instructor, using description of the landscape area, the soil analysis report, and fertilizer application reports from the state agricultural agencies.

LEARNING ACTIVITIES

1 READ "Landscaping the Home and School Grounds", Vocational Education Media Center in cooperation with the State Department of Education, Clemson University, Clemson, SC 29631, pp. 55-56 and 67.

or

2 READ "Cool-Season Grasses for South Carolina Piedmont Lawns", Circular 528, Clemson University Extension Service, Clemson, SC 29631, pp. 16-18.

or

3 READ "Warm-Season Lawn Grasses for South Carolina", Circular 547, Clemson Extension Service, pp. 16, 23.

or _____

4 READ the Instructions, Developing Fertilization Schedules.

5 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Not applicable

TOOLS AND EQUIPMENT

None

MATERIALS AND SUPPLIES NEEDED

Enclosure I, FERTILIZATION SCHEDULE FORM

Enclosure II, DESCRIPTION OF LANDSCAPED AREA

Enclosure III, SOIL ANALYSIS REPORT

INSTRUCTIONS

DEVELOPING FERTILIZATION SCHEDULES

(1) Review the description of the landscaped area for which you will prepare a fertilization schedule. The description is included as Enclosure II with this learning packet.

(2) Review the Soil Analysis Report, Enclosure III.

(3) Refer to the publications listed under "Learning Activities" for recommended analysis and rates of application of various fertilizers.

(4) List each type tree, shrub, and lawn grass on the schedule form, Fertilization Schedule, Enclosure I.

(5) List on Enclosure I, Fertilization Schedule form, the fertilizer analysis and rate of application for each shrub, tree, and lawn area.

(6) Indicate the approximate dates for fertilizing each shrub, tree and lawn area. Do this by placing an "X" in the "Months" column to indicate the month of the year in which the fertilizer is to be applied.

(7) Under the column "Remarks", also on Enclosure I, indicate any special conditions. For example, certain acid soil plants need a special purpose fertilizer which will help keep the soil pH low.

STUDENT SELF-CHECK
DO NOT WRITE ON THIS PAGE!
DEVELOPING FERTILIZATION SCHEDULES

Answer True or False on the following five questions.

1. Soil tests are the best way to determine the correct fertilizer to use for various plants.

   True____ False _____

2. To maintain shrubs in a healthy condition they should be fertilized in the late fall.

   True_____False _____

3. Azaleas and camellias require an acid soil (soil with a low pH) for best growth.

   True_____False _____

4. Fertilizer should be applied to trees in the month of November.

   True _____False_____

5. The amount of fertilizer used per shrub depends on the size of the plant. Since a large shrub generally occupies a larger space than does a small shrub, then the size of the area occupied by the plants can serve as a guide for the amount of fertilizer to use.

   True ____ False _____

Choose the correct answer for questions 6–12.

6. A 10-10-10 analysis fertilizer is used for shrubs and trees if soil tests indicate phosphorus (P) and potassium (K) are
   (a) high
   (b) low to medium

7. The use of a fertilizer analysis such as 16-4-8 would be indicated if soil tests show phosphorus (P) in the soil is
   (a) high
   (b) low to medium

8. In order to stimulate or hasten growth in plants, a fertilizer can be applied containing extra
   (a) calcium
   (b) nitrogen
   (c) sulfur
   (d) iron

9. Based on soil tests, fertilizer grades used for trees are _____ from those recommended for shrubbery.
   (a) the same
   (b) different

10. Cool season grasses such as Tall Fescue should receive the major portion of their fertilizer during the _____ months.
    (a) summer
    (b) fall

11. Warm season grasses such as Bermuda or St. Augustine should be fertilized during the _____ months.
    (a) summer
    (b) fall

12. Lawns can be limed
    (a) at any season of the year
    (b) only during the winter season

On questions 13-16 calculate the amount of fertilizer needed for the number of plants or for the area indicated:

13. Small size shrubs occupying an area of 50 sq. ft. (4.65 sq. m) with soil medium to low in P and K would require _____ lbs. of 5-10-10 or 10-10-10.

14. Large size shrubs occuyping an area of 800 sq. ft. (74.32 sq. m) with soil high in P and K would require _____ to _____ lbs. of fertilizer such as 16-4-8 or 10-6-4.

15. A tree with a diameter of 12 inches (30.5 cm) will require a total of _____ to _____ lbs. of complete fertilizer depending on the vigor of the tree and the amount of growth desired.

16. A tree with a diameter of 4 inches (10.2 cm) will require an amount of _____ to _____ lbs. of complete fertilizer.

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Develop a one-year schedule for applying fertilizer to shrubs, trees, and lawns. Your instructor will provide you with the necessary form for the schedule which is listed under Materials and Supplies Needed, page 2.

CORRECT RESPONSES

1. True
2. False
3. True
4. False
5. True
6. (b) low to medium
7. (a) high
8. (b) nitrogen
9. (a) same
10. (b) fall
11. (a) summer
12. (a) at any season
13. 5
14. 12 to 20
15. 12 to 48
16. 2 to 8

FERTILIZATION SCHEDULE

Plant Species	Month of Application												Fertilizer Analysis	Rate of Application	Remarks
	J	F	M	A	M	J	J	A	S	O	N	D			

4—4

ENCLOSURE I

DO NOT WRITE ON THIS SHEET

DESCRIPTION OF LANDSCAPED AREA

The area for which you will prepare a fertilization schedule is a public building with landscaped grounds. Lawn grasses on the grounds are:

Tall Fescue – 60,000 sq. ft of area (5574.2 sq. m)
Common Bermuda – 18,000 sq. ft of area (1672.25 sq. m)

Shrubs used in foundation plantings and in beds and borders are:

Azaleas (small) 6,000 sq. ft of area (557 sq. m)
Camellias 5,000 sq. ft of area (464.5 sq. m)
Hollies, Japanese (small) 3,600 sq. ft. of area (334.5 sq. m)
Pyracantha 2,500 sq. ft. of area (232.25 sq. m)
Junipers 3,200 sp. ft. of area (297.29 sq. m)

Trees on the grounds are as follows:

Oaks – 30 trees with an average diameter of 20 inches (50.8 cm)
Red Maple – 12 trees with an average diameter of 15 inches (38 cm)
Dogwood 40 trees with an average diameter of 4 inches (10 cm)

REPORT ON SOIL TESTS
CLEMSON UNIVERSITY
SOIL TESTING LABORATORY
CLEMSON, S.C. 29631

COPY TO:

NAME DOE JOHN
ADDRESS
CITY ANYWHERE

COUNTY SPECIAL
DATE 03/26/79

LAB NO.	SAMPLE	SOIL CODE	SOIL PH	BUFFER PH	SOIL TEST RESULTS P	K	MG	CA	S	CROP TO BE GROWN	LIMESTONE RECOMMENDATIONS POUNDS PER 1000 SQ. FT.
3[illegible]1	1	2	5.6	7.35	48 M	134 M	71 M	28. L		C. SEASON GR. MAINT.	46
FERT. REC. & COMMENTS FOR THIS SAMPLE ARE 2, 189											
3J01[illegible]2	2	3	5.6	7.50	30 L+	126 M	26 L	540 M		W. SEASON GR. MAINT.	46
FERT. REC. & COMMENTS FOR THIS SAMPLE ARE 1, 199											

4-6

FERTILIZER RECOMMENDATIONS AND COMMENTS:

2 SOIL ACIDITY AND LOW CALCIUM CAN BE CORRECTED WITH DOLOMITIC OR CALCITIC LIMESTONE AT THE RECOMMENDED RATE.

189 PER 1,000 SQ. FT. APPLY 10 LBS. 10-10-10 OR 8 LBS. 16-4-8 IN SEPTEMBER AND 16 LBS. 16-4-8 IN NOVEMBER. IF MORE GROWTH OR BETTER COLOR IS DESIRED, ADD 1 LB. N (3 LBS. AMMONIUM NITRATE, 5 LBS. CALCIUM NITRATE, OR EQUIVALENT) IN LATE JANUARY.

1 SOIL ACIDITY AND LOW MAGNESIUM CAN BE CORRECTED WITH DOLOMITIC LIMESTONE AT THE RECOMMENDED RATE.

199 PER 1,000 SQ. FT. APPLY 10 LBS. 10-10-10 OR 15 LBS. 16-4-8 WHEN SPRING BEGINS AND REPEAT IN MID-SUMMER. IF MORE GROWTH OR BETTER COLOR IS DESIRED, MAKE ADDITIONAL APPLICATIONS OF 1 LB. N (3 LBS. AMMONIUM NITRATE OR EQUIVALENT) AT 2-MONTH INTERVALS OR A THIRD APPLICATION OF 15 LBS. 16-4-8.

ENCLOSURE (B) 7

REPORT ON SOIL TESTS
CLEMSON UNIVERSITY
SOIL TESTING LABORATORY
CLEMSON, S.C. 29631

COPY TO:

NAME DOE JOHN
ADDRESS
CITY ANYWHERE

COUNTY SPECIAL
DATE 03/26/79

LAB NO.	SAMPLE	SOIL CODE	SOIL PH	BUFFER PH	SOIL TEST RESULTS P	K	MG	CA	S	CROP TO BE GROWN	LIMESTONE RECOMMENDATIONS POUNDS PER 100 SQ. FT.
30C103	3	2	5.5	7.25	15 L	48 L	81 M	220 L		SHRUBS	5

FERT. REC. & COMMENTS FOR THIS SAMPLE ARE 2, 150, 151, 157

FERTILIZER RECOMMENDATIONS AND COMMENTS:

2 SOIL ACIDITY AND LOW CALCIUM CAN BE CORRECTED WITH DOLOMITIC OR CALCITIC LIMESTONE AT THE RECOMMENDED RATE.

150 UNIFORMLY SPREAD FERTILIZER OVER AREA BEGINNING 6 INCHES FROM THE TRUNK AND EXTENDING WELL BEYOND THE END OF BRANCH SPREAD. IT IS NOT NECESSARY TO REMOVE THE MULCH BEFORE APPLYING THE FERTILIZER. BRUSH OR RINSE THE FERTILIZER FROM THE LEAVES AND STEMS.

151 ANY SINGLE APPLICATION OF NITROGEN SHOULD NOT EXCEED 2.1 LB. OF WATER-SOLUBLE NITROGEN PER 100 SQ. FT.

157 PER 100 SQ. FT. APPLY 2 PINTS OF 8-8-8 OR EQUIVALENT IN EARLY SPRING AND REPEAT IN EARLY SUMMER. IF PLANTING TO BE MADE INCORPORATE ADDITIONAL 2 PINTS OF 20% SUPERPHOSPHATE PER 100 SQ. FT.

DO NOT WRITE ON THIS SHEET

LAP 4

Student _____

Date _____

DEVELOPING FERTILIZATION SCHEDULES

Instructor's Final Checklist

Check the student's performance in the following elements of developing fertilization schedules.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Listed fertilizer analyses corresponded with recommendations of the approved references.	[ ]	[ ]	[ ]	[ ]
2. Listed fertilizer rates agreed with the rates given in the recommended references.	[ ]	[ ]	[ ]	[ ]
3. Checked fertilizer application dates with application dates recommended in the approved references.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 5

COMPILING INFORMATION NECESSARY FOR PURCHASING CHEMICALS FOR SHRUBS, TREES, AND LAWNS

Objective No. 7

Ornamental Horticulture

INTRODUCTION

A major problem in maintaining attractive ornamental plants is the control of destructive insects and diseases. The proper use of insecticides and fungicides will control most of these pests. The landscape gardener or groundskeeper should keep on hand a supply of the main chemicals recommended for controlling the more common insects and diseases. Having the chemicals on hand will help insure their prompt use and often allows them to be purchased at more favorable prices. In this learning activity package you will learn how to compile information necessary for purchasing chemicals for shrubs, trees, and lawns.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a description of a landscaped area, compile the necessary information for purchasing chemicals for shrubs, trees, and lawns. The written information must include, and will be checked for, correct brand names, item quantities, and supplier names and addresses. For satisfactory learner performance, the total cost for items to be purchased must be accurate as substantiated by instructor calculations.

LEARNING ACTIVITIES

1 READ the Instructions, COMPILING INFORMATION NECESSARY FOR PURCHASING CHEMICALS FOR SHRUBS, TREES, AND LAWNS.

2 READ in *Landscaping the Home and School Grounds:*

(a) p. 58 "Controlling Insects and Diseases of Ornamentals."

(b) p. 76, "Insects and Insect Control" (Lawns).

(c) p. 77, "Diseases and Disease Control" (Lawns).

or _____

3 READ the DESCRIPTION OF LANDSCAPED AREA.

4 VISIT one or more business firms which sell chemicals for controlling plant insects and diseases. During your visit complete the INTERVIEW GUIDE.

5 FILL IN the CHEMICAL PURCHASE CHART.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

7 ARRANGE with your instructor to complete this package by going through the Check-Out Activity.

SAFETY

As you complete the instructions in this package, you should become familiar with the safety precautions which must be observed in handling and storing the pesticides. Manufacturers' reference literature and chemical container labels will carry this important information.

EQUIPMENT NEEDED

None

MATERIALS NEEDED

1. Description of landscaped area
2. Interview Guide; this form will be used in interviewing a dealer in insecticides and fungicides.
3. Available reference literature of insecticide and fungicide manufacturers
4. Chemical Purchase Chart on which to compile information necessary for purchasing chemicals for shrubs, trees, and lawns.

INSTRUCTIONS

COMPILING INFORMATION NECESSARY FOR PURCHASING CHEMICALS FOR SHRUBS, TREES, AND LAWNS

(1) Review DESCRIPTION OF THE LANDSCAPED AREA; this form will be used later for compiling necessary information for purchasing chemicals.

(2) List on the CHEMICAL PURCHASE CHART the shrubs, trees, and lawn areas described.

(3) Visit a dealer handling insect and disease control chemicals. Complete the INTERVIEW GUIDE. Also obtain from the dealer any available chemical manufacturer's reference literature.

(4) Review literature available for your area for listings and descriptions of common insects and diseases of ornamentals, and their control methods.

(5) List on the CHEMICAL PURCHASE CHART an insecticide and a fungicide and their rates of application for each type of shrub, tree, and lawn listed under paragraph 2, above.

(6) List also on the CHEMICAL PURCHASE CHART the chemicals which are to be purchased for each type shrub, tree, and lawn:

(a) Brand name

(b) Item quantities

(c) Name, address, or location of supplier

(7) Total the costs of all chemicals listed.

(8) Present the plan to instructor for review.

DESCRIPTION OF LANDSCAPED AREA

The landscaped area for which you are to prepare a purchase list of chemicals contains the following plants and areas:

No. Plants	Type Plant
60	Azaleas, Kurume type (small)
20	Camellias (large)
12	Pyracantha (large)
36	Boxwood (small)
10	Holly, Burford (large)
20	Holly, Japanese (small)
15	Roses, Hybrid Teas (small)
5000	Square ft. lawn area, Hybrid Bermuda

INTERVIEW GUIDE

DO NOT WRITE ON THIS SHEET

(To be used as a guide in visiting a business selling chemicals for controlling insects and diseases of ornamentals and lawn grasses.)

1. (a) What are one or two insecticides of the stomach poison type which are used in controlling chewing insects on ornamentals?

   (b) Are they used as sprays or dusts?

   (c) What are their costs?

2. (a) What are one or two contact poison type insecticides used in controlling piercing-sucking types of insects on ornamentals?

   (b) Are they used as sprays or dusts?

   (c) What are their costs?

3. (a) List at least two commonly used fungicides recommended for controlling diseases of ornamental plants.

   (b) Indicate those which are usually used as a spray and those usually applied as a dust.

   (c) What is the cost of each material?

4. (a) What is an insecticide used for controlling lawn insects?

   (b) Is this material used as a spray, dust, or in granular form?

   (c) What is the cost of this chemical?

5. (a) What is a fungicide used in controlling diseases of lawn grasses?

   (b) What is the cost of this material?

CHEMICAL PURCHASE CHART

DO NOT WRITE ON THIS SHEET

A. CHEMICAL TYPE AND APPLICATION RATE

Plants	Number of plants	Chemical type	Application rate

B. CHEMICALS TO BE PURCHASED

Brand Name	Item Quantity	Cost	Supplier

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

COMPILING INFORMATION NECESSARY FOR PURCHASING CHEMICALS FOR SHRUBS, TREES, AND LAWNS

Answer the following:

1. To control "piercing-sucking" types of insects the type of insecticide to use is a

   (a) contact poison
   (b) fungicide
   (c) stomach poison
   (d) herbicide

2. Chewing insects are controlled by

   (a) contact poisons
   (b) fungicides
   (c) stomach poisons
   (d) herbicides

3. Insecticides which are absorbed by the plant in sufficient quantities to kill any insects feeding on the plant are called

   (a) herbicides
   (b) contact poisons
   (c) malathion
   (d) systemics

4. A fungicide is a chemical used to

   (a) help the spray material stick to the plant foliage
   (b) control harmful insect pests
   (c) control plant diseases
   (d) control weeds in lawns

5. A dormant season spray for scale insects on many types of shrubs is

   (a) oil emulsion
   (b) sevin
   (c) captan
   (d) methyl bromide

6. Grubs cause damage to lawns by

   (a) feeding on grass leaves and stems
   (b) eating the roots of the grass
   (c) birds feeding on the grass and digging up the turf
   (d) causing the soil to dry out

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, COMPILING INFORMATION NECESSARY FOR PURCHASING CHEMICALS FOR SHRUBS, TREES, AND LAWNS.

Compile the necessary information for purchasing liquid or granular chemicals for shrubs, trees, and lawns on an area described by your instructor.

CORRECT RESPONSES

1. (a) 2. (c) 3. (d) 4. (c) 5. (a) 6. (b)

DO NOT WRITE ON THIS SHEET

LAP 5

Student _____

Date _____

COMPILING INFORMATION NECESSARY FOR PURCHASING CHEMICALS FOR SHRUBS, TREES, AND LAWNS

Instructor's Final Checklist

Check the student's performance in the following elements of compiling information necessary for purchasing chemicals for shrubs, trees, and lawns.
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Listed all plants and lawn areas described in the landscaped area.	[ ]	[ ]	[ ]	[ ]
2. Listed an approved insecticide and a fungicide for each plant and lawn area.	[ ]	[ ]	[ ]	[ ]
3. Gave the application rate for each chemical.	[ ]	[ ]	[ ]	[ ]
4. Listed brand names supplied for all chemicals.	[ ]	[ ]	[ ]	[ ]
5. Listed chemical costs.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 6

ESTABLISHING PERFORMANCE STANDARDS

Objective No. 6

Ornamental Horticulture

INTRODUCTION

When a gardening or groundskeeping task has been completed, it is often judged or evaluated as to how well it has been done. Sometimes the evaluation is only a subconscious judgment. At other times a systematic rating is made of the completed job. But, in order to know whether a completed job or task is satisfactory, there must be some standard against which it can be compared. In order that you may gain experience in establishing job standards, in this learning activity package you will establish some performance standards for a task assigned by your instructor.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity,

or

If you need to complete learning activities in order to do the task, turn to page 2 and complete the Learning Activities in the order given.

OBJECTIVE

Given a task to treat a fungus infection on a shrub (black spot on a rose) and chemical manufacturer's specifications, list in writing three performance standards for applying a chemical to the fungus infection. Standards listed must suggest methods for preparing and applying the chemical in order to prevent damage to the shrub. Each standard must be substantiated by the instructor.

Figure 1. Don't just tell workers to mow the lawn — you may be surprised at the means they choose.

LEARNING ACTIVITIES

1 READ the Instructions, Establishing Performance Standards.

or _____

2 READ the SAMPLE LABEL. This is an abstract of the precautions and directions for use of a commonly recommended fungicide.

or _____

3 READ the label or directions for use of a fungicide which your instructor may provide.

4 CHECK YOUR KNOWLEDGE of establishing performance standards by taking the Student Self-Checks I and II.

5 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activity.

SAFETY

None

EQUIPMENT NEEDED

None

MATERIALS NEEDED

None

INSTRUCTIONS

ESTABLISHING PERFORMANCE STANDARDS

When establishing performance standards consider the following factors:

1. Degree of Accuracy – Ask yourself "How accurately do I want this task performed?" If accuracy is very important, you must be very explicit when giving directions to the worker. For example, don't just say "mow the lawn" unless accuracy is not important. Say, "mow the lawn to a height of 1" using a reel type mower, remove clipping, mow perpendicular to the road, etc."

2. Time – Sometimes time standards may be important. Workers need to know what is expected of them. For example, instead of saying, "mow the hole number nine," it may be best to say, "I would like you to mow fairway five by noon." It may be good to explain such time standards to all workers.

3. Safety – Safety is a constant responsibility of the supervisor. Safety standards should be made very explicit in all task assignments. Never just say, "apply the chemicals safely." Be explicit. For example, say, "wear a respirator or gloves or goggles," or "read those labels carefully, if you don't understand completely, see me." Let the workers know that you have standards and that you expect them to observe these standards.

4. Function – Sometimes standards must be stated in terms of the end product or function. For example, adjust the carburetor such that the engine runs smoothly.

Perhaps the key idea in setting standards is being explicit. Don't give general directions – give specific directions. Don't just tell the workers what is to be done – tell them what tools, equipment or supplies are to be used and *how well* the task is to be done.

Try developing some performance standards for applying chemicals to shrub as follows:

(1) READ the instructions and precautions for the use of a recommended fungicide for controlling black spot on roses. You may use the SAMPLE LABEL or your instructor may substitute a fungicide package containing directions and precautions for use.

(2) Write down three performance standards for applying a chemical to a fungus on a shrub. While the directions and precautions you have just studied apply specifically to one fungicide material and one type of shrub, you should select for the standards you will list, items that generally would apply to most fungicides. For example, you might give as a performance standard: "This fungicide must be kept out of lakes, streams, or ponds."

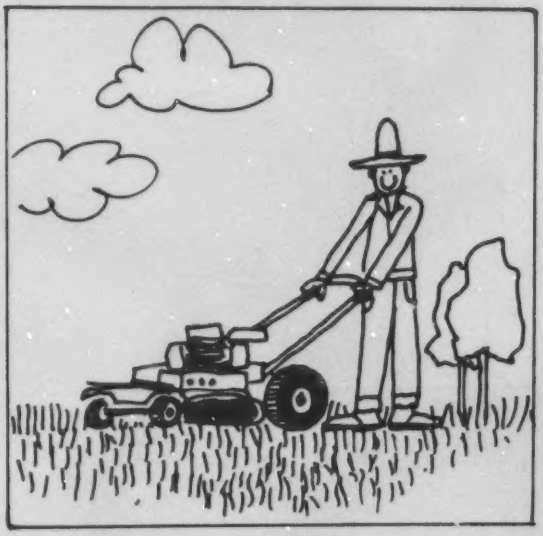


Figure 2. When you give instructions, be very specific – tell workers what, when, where, and how well the job is to be done.

SAMPLE LABEL

An abstract from the label of a plant fungicide is given below. (The directions for its use on roses only are listed here.)

XXXX SPRAY CONCENTRATE

KEEP OUT OF THE REACH OF CHILDREN

CAUTION: May be absorbed through skin and throat. Do not breathe dust. Keep away from fire and sparks. May cause irritation to eyes, nose, throat and skin. Wash thoroughly after handling. This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment, or disposal of wastes. Apply this product only as specified on this label.

DIRECTIONS

Mix XXXX SPRAY CONCENTRATE with water using one level tablespoonful per gallon of spray. Apply to obtain thorough coverage only. Make applications when plants are thoroughly dry and drying conditions are good. Apply at 5 to 7 day intervals and following rains. XXXX SPRAY CONCENTRATE is compatible with most insecticides except spray oils and highly alkaline materials. Remove residue from sprayed vegetables by washing. Do not reuse containers. Destroy when empty.

ROSES: For the control of black spot begin applications when first leaf buds begin to unfold. Spray ground around plants generously to help control black spot infection from old leaves.

EPA Reg. No. 000-000

STUDENT SELF-CHECK I

DO NOT WRITE ON THIS SHEET.

ESTABLISHING PERFORMANCE STANDARDS

List at least four types of performance standards:

1.

2.

3.

4.

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CORRECT RESPONSES

1. Degree of Accuracy, i.e., within ¼ inch (.64 cm) of the recommended mowing height.
2. Time, i.e., mow the ¼ acre lawn in 3 hours.
3. Safety, i.e., apply chemicals in such a manner as not to jeopardize personal safety.
4. Function, i.e., adjust the carburetor such that the engine runs smoothly.

STUDENT SELF-CHECK II

DO NOT WRITE ON THIS SHEET.

ESTABLISHING PERFORMANCE STANDARDS

Check either True or False.

1. Some type of plant diseases may be controlled more effectively by one type of fungicide than by another.

   True ___ False ___

2. Some fungicides may be harmful to humans, other animals, and fish.

   True ___ False ___

3. Fungicides should not be applied in windy weather because it might blow into areas where it may cause harm.

   True ___ False ___

4. One application of a fungicide will usually be sufficient to last through a growing season.

   True ___ False ___

5. Plants cannot be harmed by excessive amounts of fungicide.

   True ___ False ___

6 A fungicide that is "compatible" with other chemicals is one that will mix uniformly without being chemically changed.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, ESTABLISHING PERFORMANCE STANDARDS.

List in writing 3 performance standards for applying a chemical to a fungus infection on a shrub.

CORRECT RESPONSES

1. True 2. True 3. True 4. False 5. False
6. True

DO NOT WRITE ON THIS SHEET

LAP 6

Student _____

Date _____

ESTABLISHING PERFORMANCE STANDARDS

Instructor's Final Checklist

Check the student's performance in the following elements of establishing performance standards.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Listed a total of 3 performance standards.	[ ]	[ ]	[ ]	[ ]
2. Listed performance standards included:				
(a) statement on mixing proportions	[ ]	[ ]	[ ]	[ ]
(b) statement on application amount or rate	[ ]	[ ]	[ ]	[ ]
(c) statement on safety precautions	[ ]	[ ]	[ ]	[ ]
(d) statement on application intervals	[ ]	[ ]	[ ]	[ ]
(e) statement on compatibility with other chemicals	[ ]	[ ]	[ ]	[ ]
(f) statement on disposal of used containers	[ ]	[ ]	[ ]	[ ]
(g) other manufacturer listed precaution or major item of directions from furnished instructions	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 7

DEVELOPING PROCEDURES FOR IMPROVING SOILS

Objective No. 9

Ornamental Horticulture

INTRODUCTION

Often landscape plants may fail to develop and grow satisfactorily due to poor quality of the soil in which they are planted. Shrubs, flowers, grass, and even trees may look ragged and eventually die. To prevent soil related factors from interfering with healthy plant development, a gardener or groundskeeper should know how to improve the soil when necessary. Low soil fertility, compacted tight soil, insufficient moisture, poor drainage, lack of adequate mulching – any one or more of these soil deficiencies must be corrected if landscape plants are to thrive. In this learning activity package you will develop procedures for improving soils.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a description of a landscaped area (which has low fertility soil) and soil analysis, develop procedures for improving the soil in the area. Procedures must be developed for each soil improvement method listed in an instructor checklist and for each type shrub contained in the area. Procedures listed must match the recommendations of your state experiment stations.

LEARNING ACTIVITIES

1 READ *Landscaping the Home and School Grounds,* State Department of Education, Office of Vocational Education, Columbia, South Carolina 29201 and Clemson University Agricultural Education Department and Vocational Education Media Center, Clemson, South Carolina 29631, pp 43-45, 55-57, 63, 64, 67 Maintenance.

or

2 READ Circular 476, *Fertilizer Recommendations for South Carolina,* Cooperative Extension Service, Clemson University, Clemson, South Carolina 29631, pp. 17, 18, and 19 (subparagraph "Shade Trees").

or _____

3 READ the instructions.

4 COMPLETE the Soil Improvement Chart.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

6 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Not applicable

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

None

INSTRUCTIONS

DEVELOPING PROCEDURES FOR IMPROVING SOILS

(1) Review description of landscaped area, including soil analysis summary.

(2) Determine methods to be used to improve soil.
   a. Improving soil texture
   b. Adding fertilizers and/or lime
   c. Improving soil drainage
   d. Irrigating soil
   e. Adding mulches

(3) Develop procedures for each soil improvement method.

(4) Present to instructor for review.

LANDSCAPED AREA DESCRIPTION

In developing procedures for improving soils your instructor may give you a description of a particular landscaped area. If no specific area is assigned, you may use the following described area:

1. Area is to be landscaped for residential grounds.

2. Soil is a moderately deep, fine texture clay.

3. Drainage is good.

4. Soil analysis shows a soil pH of 6.1, phosphorus (P) low, and potassium (K) low.

5. An abundance of partially decomposed leaves are available for soil conditioning and baled straw or leaves can be obtained for mulching.

6. Plants to be used for landscaping:
   (a) Azaleas and Rhododendrun (to be planted).
   (b) "Other shrubs" including Pieris japonica, Photinia glabra, and varieties of Ilex cornuta and Ilex crenata (to be planted).
   (c) Tall fescue (to be planted).
   (d) Several shade trees, oaks and maples 10 inches to 15 inches (25.4 to 38.1 cm.) in diameter, and already growing in the yard.

SOIL IMPROVEMENT CHART

DO NOT WRITE ON THIS SHEET

IMPROVEMENT	METHOD	PROCEDURE
Texture	_____	1. 2. 3.
Soil Chemistry	_____	1. 2. 3.
Drainage	_____	1. 2. 3.
Irrigation	_____	1. 2. 3.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

DEVELOPING PROCEDURES FOR IMPROVING SOILS

Answer questions 1–3 True or False and complete questions 4–8.

1. In growing ornamental plants, drainage can be improved by filling in the area, by ditching, and by using tile. True False

2. Among soil amendments which will help loosen tight soils and improve their tilth or condition are peat, leaf mold, and decomposed sawdust. True False

3. The amount of fertilizer to use on shade trees is based on the height of the trees. True False

(Complete the following statements):

4. Two advantages of using a plant mulch are:
   a. _____
   b. _____

5. Two materials commonly used for mulching plants are:
   a. _____
   b. _____

6. For most lawn grasses the optimum pH is between _____ and _____ .

7. A pH of _____ to _____ is desirable for shrubs that do best in a very acid soil.

8. A recommended analysis of fertilizer for use in preparing plant beds for ornamental plants is _____.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate you using the Instructor's Final Checklist.

When given a description of a landscaped area with low fertility soil, develop procedures for improving the soil.

CORRECT RESPONSES

1. True 2. True 3. False 4. (Conserves moisture, suppresses grass and weeds, prevents erosion, helps control soil temperature) 5. (Peat, bark, pine needles, straw, leaves, plastic film, and others) 6. (6.0) and (7.0) 7. (5.0) to (6.0) 8. (5-10-10)

DO NOT WRITE ON THIS SHEET

LAP 7

Student _____

Date _____

DEVELOPING PROCEDURES FOR IMPROVING SOILS

Instructor's Final Checklist

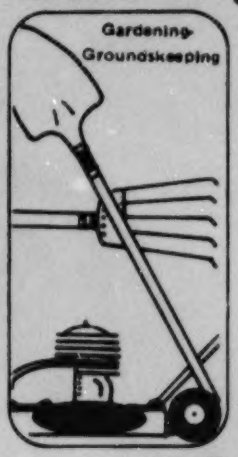
Check the student's performance in the following elements of developing procedures for improving soils.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Added topsoil properly	[ ]	[ ]	[ ]	[ ]
2.	Prepared and used compost properly	[ ]	[ ]	[ ]	[ ]
3.	Fertilized and limed soil evenly	[ ]	[ ]	[ ]	[ ]
4.	Improved drainage properly	[ ]	[ ]	[ ]	[ ]
5.	Irrigated properly	[ ]	[ ]	[ ]	[ ]
6.	Mulched properly	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 8



ESTABLISHING

SAFETY REGULATIONS

Objective No. 20

Ornamental Horticulture

INTRODUCTION

In gardening and groundskeeping operations many tasks involve the operation, adjustment, and maintenance of various types of machinery and equipment. New or inexperienced operators may at times be called on to operate the implements. It is essential that safe operating practices be followed by all machine or equipment operators. Therefore, safety regulations should be established for the safe operation of each machine or piece of equipment. This will help standardize safe practices and insure that they are understood and followed by all operators. In this learning activity package you will establish safety regulations for one item of groundskeeping equipment.

DIRECTIONS

Read the objective below. If you think that you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given the manufacturer's manual and a description of a task to be performed, develop a list of five safety regulations for using a gang-type self-propelled reel-type mower under the conditions described. The instructor will refer to the manufacturer's manual to check the list for accuracy.

LEARNING ACTIVITIES

1 READ operating instructions and maintenance information in the *Manufacturer's Manual* for the equipment for which you will establish safety regulations.

or _____

2 STUDY the "Safety Precautions" and all "Warning" or "Caution" notices in the Manufacturer's (Owner's) Manual.

3 READ the instructions.

4 REFER to the Instruction Sheet for description of task to be performed. (This task is for use as an example or case study only as an aid in preparing your list of safety regulations for a reel-type mower.) Your instructor may wish to substitute a description of a different task.

5 CHECK YOUR KNOWLEDGE of establishing safety regulations for power mowers by taking the Student Self-Check.

6 ARRANGE with your instructor to complete this learning activity package.

SAFETY

Not applicable

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

Manufacturer's (Owner's) Manual for the equipment for which Safety Regulations will be developed.

INSTRUCTIONS

ESTABLISHING SAFETY REGULATIONS

From the following, make a list of five different specific safety regulations:

(1) Safe handling and storage of fuel.

(2) Starting the engine.

(3) Stopping and parking the equipment.

(4) Operating the equipment under various ground and turf conditions.

(5) Special precautions for the specific equipment.

(6) General safety precautions for machinery operation.

INSTRUCTION SHEET

Description of Task To Be Performed With A Three-Reel Gang-Type Self-Propelled Mower:

(A different mower task may be substituted for the one given below if more suitable for local conditions. It is also satisfactory to substitute the use of the manufacturer's manual of a different type of power mower if the instructor feels this would be more applicable.)

Consider that the mower is to be used to mow an athletic field. On one side of the playing area and grounds are some sloping banks (12% slope) which are also to be mowed. Consider that mower reel height adjustment has already been made but that the equipment must be refueled, checked, and driven across a highway to the work area. After completion of the task the equipment is to be returned and parked in an enclosed storage area.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

ESTABLISHING SAFETY REGULATIONS

Answer True or False.

1. Any adult who is qualified to operate a pickup truck or a tractor should be able without further instruction to safely operate a gang-type self-propelled reel mower.

   True ___ False ___

2. With reel-type power mowers there is no problem of damage caused by striking foreign objects in the work area.

   True ___ False ___

3. The reels should be kept engaged when starting and when parking a reel-type mower.

   True ___ False ___

4. A power mower should not be refueled while the engine is hot or is running.

   True ___ False ___

5. Mower cutting height adjustments should not be made while the engine is running.

   True ___ False ___

6. Children or other passengers should not be allowed to ride on the power mower.

   True ___ False ___

7. The mower operator should maintain a high rate of speed on steep slopes and when making sharp turns.

   True ___ False ___

8. Every precaution should be taken to keep hands, feet, and clothing away from moving parts of power-driven equipment.

   True ___ False ___

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Develop a list of safety regulations for a reel-type mower. You may use the manufacturer's manual.

CORRECT RESPONSES

1. False 2. False 3. False 4. True 5. True

6. True 7. False 8. True

DO NOT WRITE ON THIS SHEET

LAP 8

Student _____

Date _____

ESTABLISHING SAFETY REGULATIONS

Instructor's Final Checklist

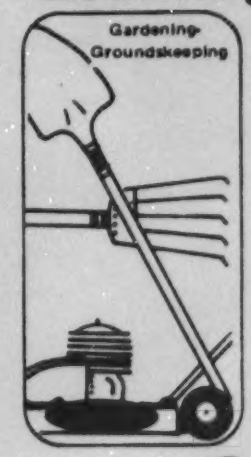
Check the student's performance in the following elements of establishing safety regulations.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Listed at least five safety regulations.	[ ]	[ ]	[ ]	[ ]
2. Safety regulations as developed conform to safe operating practices listed in the manufacturer's manual.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 9



DIRECTING INSPECTION ACTIVITIES

Objective No. 19

Ornamental Horticulture

INTRODUCTION

Every business or industry must establish certain standards for its products or services. Gardening and groundskeeping businesses are no exception. Regardless of whether you are working for an individual, a commercial firm, or a governmental unit, someone will evaluate how well the work is performed. You should become acquainted with the job standards and be able to evaluate your own work performance. To illustrate how you can evaluate or inspect a task or job, in this learning activity package you will practice inspection activities. You will use as an example the task of planting annual flowers, and for the task, develop a list of inspection points for evaluating the job performance.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a gardening task of planting annual bedding plants, develop a list of inspection points to evaluate work performed. For satisfactory performance, at least six statements must match the inspection statements listed in the Student Self-Check.

LEARNING ACTIVITIES

1 READ *How to Grow Annuals,* pp. 11-13, Sunset Books, Lane Magazine and Book Company, Menlo Park, Ca. 94025.

or

2 READ *Flowering Annuals for South Carolina,* Clemson University Extension Cir. EC 546, paragraphs "Selecting Annuals," "Using Annuals in the Landscape," "Preparing the Soil," and Table 2 - "Location," and "Spacing."

or _____

3 READ the Instructions.

4 OBTAIN one or more catalogs of flowering annuals as references for colors and growth heights for flower varieties to be used.

5 REVIEW learning activity package no. 8, Preparing Soil for Planting with Rotary Tiller, if a tiller is to be used for soil preparation.

6 PRACTICE by performing the EXERCISE on page 3.

7 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

8 ARRANGE with your instructor to complete this package by going through the Check-Out Activity.

SAFETY

Not applicable.

EQUIPMENT NEEDED

None

MATERIALS NEEDED

None

INSTRUCTIONS

A – FACTORS TO BE CONSIDERED IN SETTING INSPECTION POINTS

When setting inspection points the supervisors must decide whether or not it is more important to observe the process, or the product (outcome) or both. For example – pruning a tree. Is it more important to observe workers as they prune the tree (process) or is it adequate and more efficient to observe only the product (the pruned tree)? In this case the answer may depend upon the experience of the workers. If the workers are experienced the supervisors may choose only to check performance after the pruning of the first tree. However, if the workers are relatively inexperienced the supervisors may need to check progress after each worker has pruned only one limb of a tree.

Other factors to consider in selecting check points might be:

(1) safety of workers
(2) criticality of the task (how important is the total success of the operation)
(3) difficulty
(4) complexity
(5) scope
(6) timing (when is the task observable – for example, you can't determine the fertilizer placement after the crop is planted)

INSTRUCTIONS

B – DIRECTING INSPECTION ACTIVITIES

To be able to perform an inspection, you must have an understanding of the task that is being inspected. Without an understanding of the criteria for judgement, no goals can be set to measure against.

1. Read references 1 or 2 under LEARNING ACTIVITIES.

2. Having read the appropriate sections in the material listed, draw up a list of inspection points to verify that all work has been done. (See EXERCISE, p. 3.)

3. Your inspection checklist should include the following activities involved in planting annuals:

   a. soil preparation
   b. choosing appropriate plants
   c. planting
   d. soil protection
   e. watering
   f. post-planting care

   You may wish to use CHART I, SELECTING INSPECTION POINTS, p. 4.

4. Use the references as a guide to setting up specific criteria in each activity.

5. Take the Student Self-Check, and use the Correct Responses as a guide in evaluating your checklist.

EXERCISE

Determine the probable inspection points for the following hypothetical activity.

Planting a Flower Bed

(Note you may need to review the references listed in the Learning Activities.)

1. Add soil amendments.
2. Add fertilizer.
3. Turn soil with spading fork or rotary tiller. (Soil should be broken to a depth of 6-8 inches, 15-20 cm)
4. Rake area free of large clods and trash.
5. Obtain bedding plants; see that the species are suitable for the exposure, i.e., adaptable to sun or shade conditions.
6. Set plants, using trowel or garden hoe for making holes. Observe the following:
   a. spacing (according to growth habit) (see reference no. 2 or no. 3)
   b. place plants so that taller varieties are placed in the back
   c. group a number of plants of a variety to avoid spotty appearance
7. Use a suitable mulch.
8. Thoroughly water the plants.
9. If needed, construct shading.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

DIRECTING INSPECTION ACTIVITIES

I. List at least two items to consider when selecting inspection points.

II. To check your technical knowledge needed to adequately direct inspection activities answer the following questions.

(1) When preparing the soil, list four things that must be done:

a. _____
b. _____
c. _____
d. _____

(2) When choosing plants for a location, list two qualities to look for:

a. _____
b. _____

(3) When planting bedding plants, they should be set with attention to:

a. _____
b. _____
c. _____

(4) How should the soil around the plants be protected?

(5) The last step in the planting process is _____.

CORRECT RESPONSES

I. (1) safety of workers
(2) criticality of the task (how important the total success of the operation)
(3) difficulty
(4) complexity
(5) scope
(6) timing (when is the task observable – for example, you can't determine the fertilizer placement after the crop is planted)

II. (1) a. add soil amendments as required to make the soil suitable for the kind of plants being planted
b. add fertilizer as needed
c. till or turn the soil with a spading fork to a depth of 6-8 inches (15-20 cm)
d. rake the area free of rocks and debris

(2) a. they must be suitable to the exposure that the area receives
b. they must be suitable to the drainage available at that location

(3) a. proper spacing
b. proper depth
c. attractive display (taller varieties in the back, colors that harmonize, etc.)

(4) the soil should be covered with mulch

(5) watering

DO NOT WRITE ON THIS SHEET

CHART I

SELECTING INSPECTION POINTS

ACTIVITY	TIMING										
	Before	During	After	All		Safety	Criticality	Difficulty	Complexity	Scope	
Soil Preparation											
Plant Selection											
Planting											
Soil Protection											
Watering											
Post-plant Care											

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, DIRECTING INSPECTION ACTIVITIES.

Develop a list of inspection points to evaluate work performed in the designated gardening task.

DO NOT WRITE ON THIS SHEET

LAP 9

Student _____

Date _____

DIRECTING INSPECTION ACTIVITIES

Instructor's Final Checklist

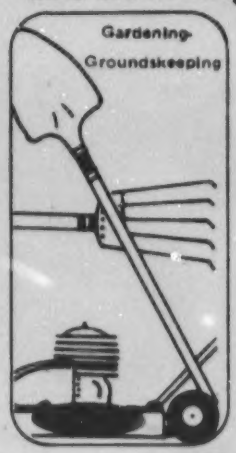
Check the student's performance in the following elements of directing inspection activities.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Showed an understanding of the task to be judged	[ ]	[ ]	[ ]	[ ]
2. Using references, compiled a list of inspection criteria that covered all phases of planting annuals	[ ]	[ ]	[ ]	[ ]
3. The inspection list contained at least six points covered in the Student Self-Check	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 10



ORDERING REPLACEMENTS FOR PLANTS, EQUIPMENT, AND SUPPLIES

Objective No. 23

Ornamental Horticulture

INTRODUCTION

Almost every task in gardening or groundskeeping involves the use of one or more items of equipment or supplies or plants. The lack of a necessary item may delay completing the task or may lower the quality of performance. To keep the gardening or groundskeeping business or institution functioning efficiently, needed equipment, supplies, or plants must be ordered promptly. In this learning activity package you will order replacements for plants, equipment, and supplies.

DIRECTIONS

Read the objective below. If you think that you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity,

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a current inventory of plants, equipment, and supplies, order items necessary to bring stocks to the levels required for the previous season.

LEARNING ACTIVITIES

1 COMPARE descriptions and prices in available supply catalogs for the major items of plants, equipment, and supplies for which replacements are needed.

2 COMPLETE the SAMPLE ORDER using the sample order form.

3 READ the Instructions, ORDERING REPLACEMENTS FOR PLANTS, EQUIPMENT, AND SUPPLIES.

4 CHECK YOUR KNOWLEDGE of procedures in ordering replacements for plants, equipment, and supplies by taking the Student Self-Check.

5 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activity.

SAFETY

Not applicable.

EQUIPMENT NEEDED

None

MATERIALS NEEDED

1. Current inventory of plants, equipment, and supplies; you will order replacements for the items which are exhausted or in short supply
2. Catalogs or price lists from firms doing business in your area
3. Trade journals and magazines advertising items of the type you will order
4. Order blanks, if available, from the firms from which you will order

INSTRUCTIONS

ORDERING REPLACEMENTS FOR PLANTS, EQUIPMENT, AND SUPPLIES

(1) Determine item quantities required.

(2) Analyze current inventory for item shortages.

(3) List items to be purchased.

a. Brand name
b. Item quantities
c. Potential suppliers

(4) Compare item quality and costs with different suppliers.

(5) Compute purchase costs for items.

(6) Review purchase costs with superior.

(7) Order items from suppliers. Use their printed order blanks if available.

(8) Practice completing an order form (Ask your instructor for the sample order form.)

SAMPLE ORDER

EXERCISE

Assuming that your inventory sheet indicated that you were in need of the following equipment complete the enclosed order form:

846921	Seed and fertilizer spreader	102.00
816531	Extension hopper for spreader	15.00
180325	Dump body kit	145.00

All prices FOB Charolotte, N.C.
John Doe Equipment Co.
Anywhere
USA

SAMPLE ORDER FORM

PURCHASE ORDER PO-10

TO:

DO NOT WRITE ON THIS FORM

Date	Items Needed By	Terms	Via	FOB

Quantity	Stock No.	Description	Unit Price

By_____
Purchasing Agent

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

ORDERING REPLACEMENTS FOR PLANTS, EQUIPMENT, AND SUPPLIES

Answer each question and compare your responses to the correct ones.

1. (a) What does FOB on a shipping order mean?
   (b) What does COD on a shipping order mean?

2. (a) What does Ship by UPS mean?
   (b) What does Ship by PP mean?

3. Is State Sales Tax charged on the items you will order?

4. (a) List names and addresses of potential supply firms of the items you will order. Be sure addresses are complete, including ZIP codes.

   (b) Place a check mark (✓) in front of the name of each vendor firm which is located close enough for you to pick up items required, thus saving shipping.

   (c) Place an asterisk (*) in front of the name of each vendor firm which provides their own delivery service in your area. This may save you shipping costs and expedite delivery.

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CORRECT RESPONSES

1. (a) "Free on Board;" the quoted price is based on the item being loaded on a carrier by the shipper and the buyer pays the shipping charges.
   (b) "Collect on Delivery;" the buyer pays the carrier for the order, including carrying charges, upon delivery.
2. (a) "Ship by United Parcel Service."
   (b) "Ship by Parcel Post."
3. Depends on local information. Check with your State Tax Commission.
4. (a) Local information.
   (b) From local information.
   (c) Check firm's catalog or inquire of their sales representative.

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, ORDERING REPLACEMENTS FOR PLANTS, EQUIPMENT, AND SUPPLIES.

Order replacements for exhausted items of plants, equipment and supplies.

DO NOT WRITE ON THIS SHEET

LAP 10

Student _____

Date _____

ORDERING REPLACEMENTS FOR PLANTS, EQUIPMENT, AND SUPPLIES

Instructor's Final Checklist

Check the student's performance in the following elements of ordering replacements for plants, equipment, and supplies.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. All items were ordered which were needed to bring stocks up to required levels.				
2. The vendor selection was based on available information of quality, price, service, and prompt delivery.				
3. The order was completed with addresses and shipping instructions.				
4. The price totals, discounts, and sales taxes were figured correctly and accurately.				

Learning Activity Package No.11

TAKING AND SENDING

SOIL SAMPLES FOR ANALYSIS

Objective No. 37 & 38

Ornamental Horticulture

INTRODUCTION

All soils which are to be planted to shrubbery or lawn grasses should be tested so that the proper amounts of lime and fertilizer can be used. Also, when established plants or lawn grasses are not growing properly, soil tests can help establish and suggest remedies if the condition is due to soil deficiencies. In this learning activity package you will take soil samples using procedures established by your state soil testing laboratory. You will send the samples, together with needed information sheets, to the state soil laboratory for analysis.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

Take soil samples from an area defined by your instructor and send them to a soil testing laboratory for analysis.

Given a soil sample report for a definite area and plant nutrient tables, determine the amount of plant food needed to bring the area to a specified fertility level for specified plants. Calculations must be correct as verified by your instructor.

LEARNING ACTIVITIES

1 READ *Fertilizing Farm Crops*, S.C. State Dept. of Ed., Columbia, SC, pp. 82-83.

or _____

2 VISIT OR TELEPHONE the County Extension Office for your county. Request soil sample containers for the soil samples you will take; ask also for the record or information form to accompany the soil samples.

3 READ instructions on reverse side of information form and on the soil test containers which you have obtained.

4 READ the instructions, TAKING AND SENDING SOIL SAMPLES FOR ANALYSIS.

5 ARRANGE with your instructor to complete this module by going through the Check-Out Activities.

SAFETY

Not applicable.

EQUIPMENT NEEDED

1. Soil probe, soil auger, or square point spade.
2. Bucket, plastic or galvanized

MATERIALS NEEDED

Soil sample containers and record sheet as listed under item 2, LEARNING ACTIVITIES.

INSTRUCTIONS

TAKING AND SENDING SOIL SAMPLES FOR ANALYSIS

(1) Identify (describe) the area to be sampled on the record sheet.

(2) Determine uniformity of soil in the area to be sampled. If it contains soils that are distinctly different in appearance, plant growth, or past treatment (liming, fertilizing), each should be sampled separately.

(3) Procure soil samples by taking representative samples from the recommended depth. In obtaining samples, follow instructions on containers and/or record sheets.

(4) Package the soil sample or samples in the container(s) furnished. See Enclosure I, Part 1 and 4.

(5) Complete needed information on record sheet and soil container(s). Be sure to number each sample box and enter this number on the record sheet. See Enclosure II and Part 2 of Enclosure I.

(6) Follow instructions on the record sheet in submitting samples. See Enclosure I, Part 3. In various states requirements differ somewhat. One of the following may apply in your area:

(a) Mail soil samples directly to the Soil Testing Laboratory.

(b) Carry or mail to the local County Extension Agent

(c) A local pick-up station may be provided by a commercial firm such as a fertilizer dealer or garden supply center

(7) If samples are mailed, container boxes must be wrapped securely with shipping paper, sealed with tape or string, addressed, and sufficient postage applied.

(8) The completed information or record sheet should be placed in an envelope and attached to the soil sample mailing carton. First class postage must be affixed to the envelope. Be sure to give your own name and complete return address on both carton and attached envelope.

(9) When you receive the results of your soil test, it will be in the form of a computer print out. See REPORT ON SOIL TESTS, Enclosure III.

(10) To interpret this report, first look at the recommendation for tall fescue which is listed under the column CROP TO BE GROWN as cool season grass maintenance.

(11) Under the columns labeled SOIL TEST RESULTS, you will note that the soil was medium in available phosphorus, potassium and magnesium and low in calcium.

(12) Next note under LIMESTONE RECOMMENDATIONS that for each 1,000 sq. ft. (92.9 sq. m) of area 46 lbs. (20.9 kg) of limestone is recommended.

(13) Look at the line which says , Fertilizer recommendations and comments for this sample are 2, 189.

(14) Now look at the bottom of the page under Fertilizer Recommendations and Comments and read the comments.

CALCULATING FERTILIZER REQUIREMENTS

Soil analysis reports usually give the required amount of each nutrient needed for a given area. In most cases the report will also provide at least one recommended fertilizer which carries the nutrient along with the recommended amount of the fertilizer to be applied and the time of application. It is not therefore usually necessary to calculate the quantity of fertilizer needed. Should you need to make such calculations the following exercises may be helpful.

Situation

Your soil analysis report advises you that you should apply the following:

5 lbs. of nitrogen/acre
10 lbs. of phosphorus/acre
10 lbs. of potassium/acre

When you arrive at the store to purchase fertilizer you find that the fertilizer dealer does not ordinarily sell these three nutrients separately but does have various formulations of fertilizer materials; for example:

N-P-K
8-8-8
5-20-20
5-10-10

These numbers refer to the actual amount of nutrient per 100 lbs. For example, in the 8-8-8 analysis you would have 8 lbs. of nitrogen, 8 lbs. of phosphorus and 8 lbs. of potassium. The other 76 lbs. is "carrier" or "filler." Note that the first number in the analysis always refers to nitrogen, the second to phosphorus and the third to potassium.

Since your soil test report calls for 5 lbs. of nitrogen, 10 lbs. of phosphorus and 10 lbs. of potassium per acre, which of the three formulations would you choose?

Obviously, you would choose the 5-10-10 because it would have the exact proportion of nutrients.

How much 5-10-10 would you order?

Obviously, you would need 100 lbs. of the fertilizer material.

Sometimes your nutrient requirements are such that none of the usual analysis in which fertilizers materials are formulated (packaged) fit the requirement. For such cases a fertilizer dealer can make up a fertilizer mix to fit your needs.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

TAKING AND SENDING SOIL SAMPLES FOR ANALYSIS

Answer the following:

1. If, in taking soil samples from a field, you find two distinctly different types of soil, the number of samples to send for analysis should not be less than

   (a) two
   (b) four
   (c) five
   (d) twelve

2. Soil samples from a lawn area which is to remain in grass should be taken from the surface to a depth of not more than

   (a) 3 to 4 inches (7.62 to 10.16 cm)
   (b) 6 to 8 inches (15.24 to 20.32 cm)
   (c) 10 inches (25.40 cm)
   (d) 16 inches (40.64 cm)

3. For other than lawn or grass areas, soil samples should be taken from the surface to a depth of

   (a) 1 to 2 inches (2.54 to 5.08 cm)
   (b) 6 to 8 inches (15.24 to 20.32 cm)
   (c) 10 inches (25.40 cm)
   (d) 16 inches (40.64 cm)

4. How many equal-sized cores or slices should be obtained and mixed together in a clean bucket to obtain one representative soil sample?

   (a) 4 – 5
   (b) 6 – 8
   (c) 12 – 20
   (d) 50 – 60

5. If the soil testing agency is to make adequate recommendations on fertilizing and liming, the importance of your furnishing complete information, including crop or crops to be grown, is how important?

   (a) extremely important
   (b) slightly important
   (c) of no importance
   (d) immaterial

6. Which of the following fertilizer formulations would be most appropriate for adding 16 lbs. of nitrogen, 16 lbs. of phosphorus and 16 lbs. of potassium per acre? (16 lbs. = 7.26 kg)

   (a) 5-10-10
   (b) 10-20-20
   (c) 3-9-12
   (d) 8-8-8

7. How many pounds of a 5-10-10 fertilizer would you apply per acre to meet a requirement for 15 lbs. (6.8 kg) of nitrogen 30 lbs. (13.6 kg) of phosphorus and 30 lbs. (13.6 kg) of potassium?

   (a) 50 lbs. (22.7 kg)
   (b) 100 lbs. (45.4 kg)
   (c) 200 lbs. (90.7 kg)
   (d) 300 lbs. (136.1 kg)

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, TAKING AND SENDING SOIL SAMPLES FOR ANALYSIS.

Obtain soil sample containers and a record form. Take soil samples from an area which has been indicated to you. If the soil is uniform in quality, one sample is sufficient. If soil varies in type, texture, or previous treatment, take a sample of each of the sub-areas which is different. Follow closely the instructions of your state's soil testing laboratory so that representative samples are secured and the required record form is completed correctly. The sample(s) and accompanying record sheet must be properly packaged and addressed, then mailed or delivered to the soil laboratory or their designated local representative.

Calculate the amount of plant food needed to bring soil from a defined area to a specified fertility level for certain plants.

CORRECT RESPONSES

1. (a) 2. (a) 3. (b) 4. (c) 5. (a)
6. (d) 7. (d)

ENCLOSURE I

Part 1

HOW TO TAKE SOIL SAMPLES

1. Areas cropped or fertilized differently, or those with different soil types or textures, should be sampled separately. One soil sample should represent 10 acres or less. Only one sample is required for home gardens, lawns, or ornamental beds.
2. Use a soil auger, spade or shovel. Samples from cultivated fields should be made from the surface to plow depth (6 to 8 inches). Samples from pasture or turf should be only 2 to 3 inches deep. Subsoil samples should contain only the top 4 inches of the clay layer (B horizon).
3. Take equal-size cores, or if using a spade or shovel, a thin slice from the side of a V-shaped hole, from 12 or more locations within the sample area.
4. Place the cores or slices in a clean bucket and mix thoroughly.
5. Label and number the soil box; then loosely fill with the mixed soil. **Do not** use the same number for more than 1 sample.

Part 2

HOW TO FILL OUT THE RECORD SHEET

1. Type or print using a hard lead pencil or ballpoint pen.
2. Fill out the upper left and right sections of the form. Where blocks are located, place only a single letter or number per block. Skip a block where appropriate. In the use of long entries, abbreviate if possible. Fill only the available blocks.
3. Do not mark in the laboratory number column. Fill in the sample number. Only 20 samples may be listed and described on 1 sheet. If more than 1 sheet is required, fill out the record sheet number (1 of 2; 2 of 2).
4. Fill in the remainder of the form with the appropriate information and codes. If you are unsure of a code, ask the County Agent when you submit the samples. The field identification is for your information only. Use that column to distinguish sampled areas.
5. A specific crop and soil code **must** be entered for each sample.
6. Under "Remarks" give other information which would be helpful in making more specific recommendations.

Part 3

SUBMITTING SAMPLES AND SOIL TEST RESULTS

1. All soil samples and record sheets are to be processed through the County Agricultural Agent's Office for shipment to the Soil Testing Laboratory at Clemson, South Carolina.
2. You may request that the County Agent send a copy of the report to someone else by completing the "Copy to" section of the record sheet. The original, however, must be sent to the person submitting the sample.

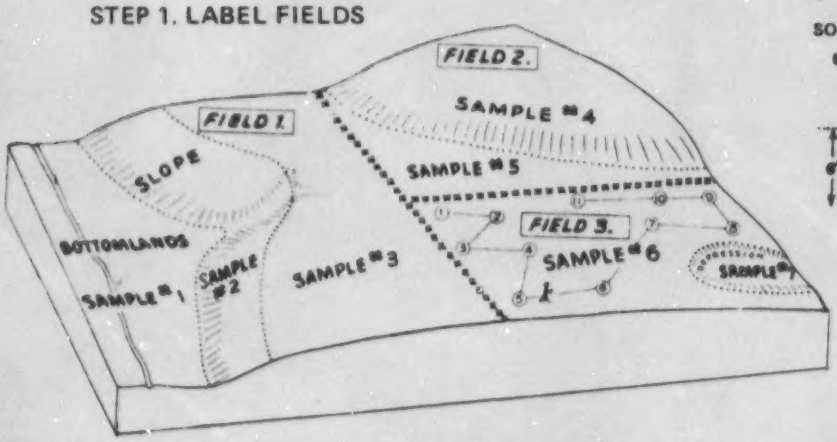
Part 4

CLEMSON UNIVERSITY COOPERATING WITH
UNITED STATES DEPARTMENT OF AGRICULTURE
EXTENSION SERVICE, WAYNE T. O'DELL, DIRECTOR, CLEMSON, S. C.
Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.

The Clemson University Extension Service is a cooperative program financed from federal, state, and county funds. It is the policy of the Service to comply fully with the regulations of Title VI, the Civil Rights Act of 1964. Complaints may be filed with the Director, Cooperative Extension Service, Clemson University, Clemson, S.C. 29631

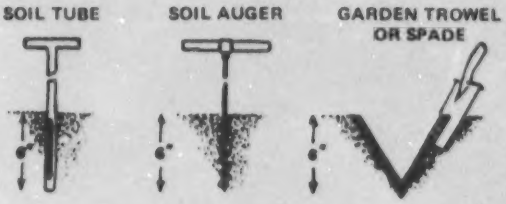
SUGGESTED STEPS FOR TAKING SOIL SAMPLES

STEP 1. LABEL FIELDS



Areas cropped or fertilized differently should be sampled separately.

STEP 2. SELECT PROPER TESTING TOOLS



STEP 3. TAKE A COMPOSITE SAMPLE

A COMPOSITE SAMPLE IS A MIXTURE OF SOIL FROM 12 TO 20 PLACES IN THE SAME FIELD AREA AS DIAGRAMED.

ENCLOSURE II
RECORD SHEET FOR SOIL SAMPLES

(SOIL TEST FORM NO. 1)
SOIL TESTING LABORATORY, CLEMSON, S.C.
SC EXPERIMENT STATION AND CLEMSON EXTENSION SERVICE

NAME _____ (8 Last First MI 27)
ADDRESS _____ (28 47)
CITY _____ (48 67)
ZIP CODE _____ (68 72)
COUNTY _____ (73 75)

RECORD SHEET NO. _____ OF _____
SAMPLES TAKEN BY _____
DATE TAKEN _____
COPY TO _____ (104 116)
(117 126)

LABORATORY NUMBER 1-7	SAMPLE NUMBER 76-80	SOIL CODE 81	CROP CODE 82-83	CROP TO BE GROWN	FIELD NAME OR NO.	ACRES REP.	DEPTH TO CLAY	SOIL SERIES

SOIL CODES:
1. Sandy
2. Coarse Loamy
3. Fine Loamy
4. Clayey
5. Subsoil Horizon Top 4" of Clay Layer

White - Laboratory; yellow - Agent; pink - Farmer

REMARKS:

11 – 6

REPORT ON SOIL TESTS
CLEMSON UNIVERSITY
SOIL TESTING LABORATORY
CLEMSON, S.C. 29631

COPY TO:

NAME DOE JOHN
ADDRESS
CITY ANYWHERE

COUNTY SPECIAL
DATE 03/26/79

LAB NO.	SAMPLE	SOIL CODE	SOIL PH	BUFFER PH	SOIL TEST RESULTS P	K	MG	CA	S	CROP TO BE GROWN	LIMESTONE RECOMMENDATIONS POUNDS PER 1000 SQ. FT.
300101	1	2	5.6	7.35	48 M	134 M	71 M	280 L		C. SEASON GR. MAINT.	46
FERT. REC. & COMMENTS FOR THIS SAMPLE ARE 2, 189											
300102	2	3	5.6	7.50	30 L+	126 M	26 L	540 M		W. SEASON GR. MAINT.	46
FERT. REC. & COMMENTS FOR THIS SAMPLE ARE 1, 199											

II-7

FERTILIZER RECOMMENDATIONS AND COMMENTS:

2 SOIL ACIDITY AND LOW CALCIUM CAN BE CORRECTED WITH DOLOMITIC OR CALCITIC LIMESTONE AT THE RECOMMENDED RATE.

189 PER 1,000 SQ. FT. APPLY 10 LBS. 10-10-10 OR 8 LBS. 16-4-8 IN SEPTEMBER AND 16 LBS. 16-4-8 IN NOVEMBER. IF MORE GROWTH OR BETTER COLOR IS DESIRED, ADD 1 LB. N (3 LBS. AMMONIUM NITRATE, 5 LBS. CALCIUM NITRATE, OR EQUIVALENT) IN LATE JANUARY.

1 SOIL ACIDITY AND LOW MAGNESIUM CAN BE CORRECTED WITH DOLOMITIC LIMESTONE AT THE RECOMMENDED RATE.

199 PER 1,000 SQ. FT. APPLY 10 LBS. 10-10-10 OR 15 LBS. 16-4-8 WHEN SPRING BEGINS AND REPEAT IN MID-SUMMER. IF MORE GROWTH OR BETTER COLOR IS DESIRED, MAKE ADDITIONAL APPLICATIONS OF 1 LB. N (3 LBS. AMMONIUM NITRATE OR EQUIVALENT) AT 2-MONTH INTERVALS OR A THIRD APPLICATION OF 15 LBS. 16-4-8.

ENCLOSURE III

REPORT ON SOIL TESTS
CLEMSON UNIVERSITY
SOIL TESTING LABORATORY
CLEMSON, S.C. 29631

COPY TO:

NAME DOE JOHN
ADDRESS
CITY ANYWHERE

COUNTY SPECIAL
DATE 03/26/79

LAB NO.	SAMPLE	SOIL CODE	SOIL PH	BUFFER PH	SOIL TEST RESULTS P	K	MG	CA	S	CROP TO BE GROWN	LIMESTONE RECOMMENDATIONS POUNDS PER 100 SQ. FT.
300103	3	2	5.5	7.25	15 L	48 L	81 M	220 L		SHRUBS	5

FERT. REC. & COMMENTS FOR THIS SAMPLE ARE 2, 150, 151, 157

FERTILIZER RECOMMENDATIONS AND COMMENTS:

2 SOIL ACIDITY AND LOW CALCIUM CAN BE CORRECTED WITH DOLOMITIC OR CALCITIC LIMESTONE AT THE RECOMMENDED RATE.

150 UNIFORMLY SPREAD FERTILIZER OVER AREA BEGINNING 6 INCHES FROM THE TRUNK AND EXTENDING WELL BEYOND THE END OF BRANCH SPREAD. IT IS NOT NECESSARY TO REMOVE THE MULCH BEFORE APPLYING THE FERTILIZER. BRUSH OR RINSE THE FERTILIZER FROM THE LEAVES AND STEMS.

151 ANY SINGLE APPLICATION OF NITROGEN SHOULD NOT EXCEED 0.1 LB. OF WATER-SOLUBLE NITROGEN PER 100 SQ. FT.

157 PER 100 SQ. FT. APPLY 2 PINTS OF 8-8-8 OR EQUIVALENT IN EARLY SPRING AND REPEAT IN EARLY SUMMER. IF PLANTING TO BE MADE INCORPORATE ADDITIONAL 2 PINTS OF 20% SUPERPHOSPHATE PER 100 SQ. FT.

69 70

ENCLOSURE III, Continued

DO NOT WRITE ON THIS SHEET

LAP 11

Student _____

Date _____

TAKING AND SENDING SOIL SAMPLES FOR ANALYSIS

Instructor's Final Checklist

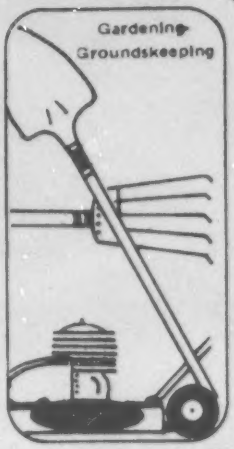
Check the student's performance in the following elements of taking and sending soil samples for analysis.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Secured the necessary soil sample container(s) and information sheet.	[ ]	[ ]	[ ]	[ ]
2. Examined the area to determine if it contained more than one soil type or texture.	[ ]	[ ]	[ ]	[ ]
3. Obtained a representative soil sample				
(a) from 12-20 spots	[ ]	[ ]	[ ]	[ ]
(b) from correct depth (see state recommendations)	[ ]	[ ]	[ ]	[ ]
(c) all cores or slices uniform	[ ]	[ ]	[ ]	[ ]
(d) cores or slices collected in a clean pail and mixed thoroughly before placing a portion in soil mailing container	[ ]	[ ]	[ ]	[ ]
4. Recorded correct information on soil container(s) and the information sheet.	[ ]	[ ]	[ ]	[ ]
5. Wrapped carton securely and addressed properly, if to be mailed; and information sheet placed in an envelope and affixed to carton.	[ ]	[ ]	[ ]	[ ]
6. Interpreted soil test correctly.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.12



EVALUATING PROCEDURES

FOR

STORAGE OF ITEMS

Objective No. 32

Ornamental Horticulture

INTRODUCTION

Gardening and groundskeeping require the use of expensive equipment. The convenient and safe storage of this equipment and the tools which are used in its upkeep and repair, plus stocking of the materials and supplies needed for daily operation, often make storage a major problem. Each gardening or groundskeeping organization or business should have a well organized plan for the convenient warehousing or storage of those items which are usually kept on hand. The cooperation of each person involved is necessary if the storage plan is to succeed. In this learning activity package you will learn to evaluate procedures for storage of items.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a set of storage procedures, develop five questions to be used in evaluating the procedure. For satisfactory performance, all questions should contain elements of those included in an instructor checklist.

LEARNING ACTIVITIES

1 VISIT, if possible, one or more organizations or businesses which must store items similar to those that you are concerned with. Study their storage layout and management plan.

2 STUDY the set of storage procedures attached to this package labeled Information Sheet; these storage procedures are to be rated as to how satisfactory they are.

3 CHECK YOUR KNOWLEDGE of storage procedures by taking the Student Self-Check, Evaluate Procedures for Storage of Items.

4 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activity.

SAFETY

Not Applicable

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

None

INSTRUCTIONS

(1) Study the outline storage procedures on the attached Information Sheet. These procedures are those presently being followed by groundskeeping personnel at a golf course.

(2) Write down five questions, questions of a general nature, which will evaluate or rate the effectiveness of the outlined storage procedures.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET!

EVALUATING PROCEDURES FOR STORAGE OF ITEMS

(Check the following True or False)

1. If they are kept painted, it is not necessary to keep groundskeeping machinery and equipment stored under shelter.

   True_____ False_____

2. Since some of it is not used every day, groundskeeping equipment in storage may be jammed together as tightly as possible.

   True_____ False_____

3. As long as one person knows where they are, it does not matter how things are arranged in groundskeeping storage.

   True_____ False_____

4. Storage facilities should contain one or more fire extinguishers of an approved type.

   True_____ False_____

5. Gallon metal cans, such as paint thinner cans or plastic gallon jugs, are suitable containers for storing small quantities of gasoline.

   True_____ False_____

6. Many engines and machines used in groundskeeping carry serial numbers to aid in identification.

   True_____ False_____

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Develop five questions to be used in evaluating a set of procedures for storage of items.

CORRECT RESPONSES

1. False 2. False 3. False 4. True
5. False 6. True

INFORMATION SHEET

SAMPLE

STORAGE PROCEDURES

In order to evaluate storage procedures, a system which is being used by the groundskeeping personnel of a golf course is outlined below. You may use this for your analysis.

Machinery and equipment
All groundskeeping equipment and machinery is returned after use,or by the end of the day, to the equipment sheds. Workers are required to report broken or malfunctioning equipment to the grounds supervisor. Frequently used equipment such as small hand or small riding mowers are kept separately where they are readily accessible. All machinery and large equipment is numbered consecutively when acquired and the numbers stenciled on the frame or other prominent place. A Service and Repair Record sheet is kept for each machine or other piece of equipment.

Groundskeeping hand tools
Tools such as shovels, rakes, pruning equipment, etc. are cleaned and placed in labeled racks or shelves after use. Generally, grounds workers use inclement weather to service equipment, clean, sharpen, and adjust tools, etc.

Shop tools
Most of the tools and specialized equipment used in machinery and equipment repair are kept in a separate tool and parts storeroom. An equipment mechanic is in charge of these tools, other workers may check out tools when needed. A workbench and tool rack with some frequently used tools is available for groundskeeping workers to use in daily equipment maintenance.

Equipment spare parts and supplies
Items such as motor oil, grease cartridges, spare spark plugs, and V-belts are kept in the tool and parts storeroom in numbered bins or racks. Groundskeeping personnel needing spare parts must obtain them from the mechanic or from the supervisor, if available. The head mechanic is responsible for keeping the parts inventories.

Grounds supplies
Fertilizer, other chemicals, seed, etc., are kept in a separate storageroom. Because of the expensive and potentially dangerous chemicals in this storage,it is kept locked. The grounds supervisor is responsible for items in this storage and issues them as needed for grounds maintenance.

DO NOT WRITE ON THIS SHEET

LAP 12

Student _____

Date _____

EVALUATING PROCEDURES FOR STORAGE OF ITEMS

Instructor's Final Checklist

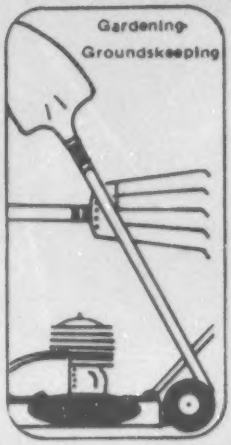
Check the student's performance in the following elements of evaluating procedures for storage of items.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Utilized space well.	[ ]	[ ]	[ ]	[ ]
2.	Arranged items so that they were accessible.	[ ]	[ ]	[ ]	[ ]
3.	Stored items in an orderly fashion.	[ ]	[ ]	[ ]	[ ]
4.	Considered guidelines.	[ ]	[ ]	[ ]	[ ]
5.	Used an item identification system that lent itself to inventory.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 13



EVALUATING CAPABILITIES OF EQUIPMENT

Objective No. 28

Ornamental Horticulture

INTRODUCTION

At times it may prove to be desirable to purchase used items of major equipment for gardening and groundskeeping operation. For items of equipment which are not in constant or regular use, an investment in new machinery may be too expensive. By purchasing some used equipment it may be possible to afford a greater variety or a larger number of some costly items. In this learning activity package you will evaluate the capabilities of a specific item of used groundskeeping equipment, a self-propelled reel-type mower.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Provided access to a used self-propelled reel-type mower and manufacturer's specifications, develop a list of at least 10 factors to be considered in evaluating the capabilities of the mower. For satisfactory performance, at least 10 factors should coincide with those items included in the instrutor's checklist. The determination of correct and incorrect factors listed will be made by the instructor.

LEARNING ACTIVITIES

1 READ manufacturer's specifications in the Owner's Manual for the self-propelled reel-type mower which you will evaluate.

or _____

2 REVIEW the Owner's Shop Record Sheet for the equipment, if one has been maintained.

3 OBTAIN information from other owners or operators of the same or similar equipment as to capabilities, handling ease, service record of this type of equipment.

4 READ the Instructions.

5 COMPLETE the checklist for Evaluating Capabilities of Equipment.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

7 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Observe safety precautions listed in the owner's manual in starting and operating the equipment.

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

None

INSTRUCTIONS

EVALUATING CAPABILITIES OF EQUIPMENT

(1) Secure the *Owner's Manual* for the used mower which you will evaluate. If there is no manual still with the equipment, one should be ordered from either the distributor or the manufacturer. There is usually a charge for a replacement manual. The engine for the equipment may be manufactured by a different company from that making the equipment itself; the Owner's Manual for the engine must then be ordered from the engine manufacturer or the distributor. In most cases a local dealer representative can order the necessary Owner's Manual or Manuals for you. In ordering a replacement, be sure to give the serial number, the model number and descriptive name for the equipment.

(2) Using the Owner's Manual, become familiar with the various parts and the operation of the equipment.

(3) Prepare a check list for listing the factors you evaluate.

(4) Before the equipment is started or operated, make some of the necessary observations:

(a) Is the size and weight of the equipment suitable for the use to which you will put it?

(b) Note signs of amount of previous use.

(c) Note amount of wear.

(d) Note strength of equipment design and construction.

(5) Start the engine and operate the equipment. Become familiar with the handling characteristics and performance of the machine.

(a) Note ease of handling.

(b) Rate engine performance.

(c) Note relative ease of changing height of cut.

(d) Are any parts in need of replacement?

(6) Ask for the present owner's Shop Record Sheet for the equipment. If available, note the past repair record on the equipment, including the engine.

(7) Inquire as to the availability of repair parts.

(8) If further help is needed in determining the serviceability of the equipment, arrange to secure the recommendations of an experienced mechanic.

CHECKLIST FOR EVALUATING CAPABILITIES OF EQUIPMENT

DO NOT WRITE ON THIS SHEET

Complete the following information for the equipment you are evaluating.

1. Name of equipment manufacturer - _____
   _____
2. Manufacturer's address - _____
   _____
   _____

3. Name of equipment - _____
_____

4. (a) Equipment Model No. - _____

(b) Model Year - _____

5. Equipment Serial No. - _____

6. Width of cut - _____

7. Weight, lbs. - _____

8. Ground speed(s) - _____

9. Name of nearest dealer - _____
_____

10. Address of nearest dealer - _____
_____
_____

11. Engine manufacturer - _____
_____

12. Engine model no. _____

13. Engine serial no. - _____

14. H.P. rating or cu. in. displacement - _____
_____

15. Name of nearest engine service - _____
_____

16. Address of nearest engine service - _____
_____
_____

Information for the particular equipment involved can be completed from Owner's Manuals and from local information.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

EVALUATING CAPABILITIES OF EQUIPMENT

1. List one publication you would ask for in evaluating used equipment.

2. List at least four factors you would consider in evaluating used equipment.

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, EVALUATING CAPABILITIES OF EQUIPMENT.

Develop a list of 10 factors that should be considered in evaluating the capabilities of a used, self-propelled reel-type mower.

CORRECT RESPONSES

1. The owner's manual
2. a. availability of repair parts
   b. signs of wear
   c. amount of wear
   d. how well the machine operates

DO NOT WRITE ON THIS SHEET

LAP 13

Student _____

Date _____

EVALUATING CAPABILITIES OF EQUIPMENT

Instructor's Final Checklist

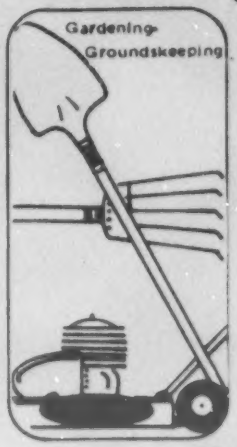
Check the student's performance in the following elements of evaluating capabilities of equipment.

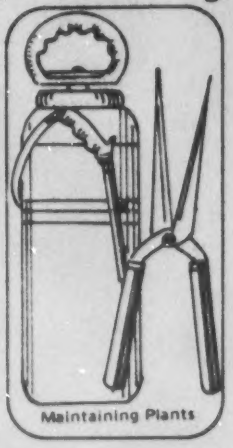
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
Completed information included:				
1. Size (width of cut)	[ ]	[ ]	[ ]	[ ]
2. Weight	[ ]	[ ]	[ ]	[ ]
3. Operating speed	[ ]	[ ]	[ ]	[ ]
4. Ease of handling	[ ]	[ ]	[ ]	[ ]
5. Amount of previous use	[ ]	[ ]	[ ]	[ ]
6. Average life of equipment	[ ]	[ ]	[ ]	[ ]
7. Service record	[ ]	[ ]	[ ]	[ ]
8. Amount of wear evident	[ ]	[ ]	[ ]	[ ]
9. Mechanical inspection results	[ ]	[ ]	[ ]	[ ]
10. Past repair record	[ ]	[ ]	[ ]	[ ]
11. Strength of construction	[ ]	[ ]	[ ]	[ ]
12. Difficulty of jobs which the equipment was designed for	[ ]	[ ]	[ ]	[ ]
13. Recommendation(s) from an experienced repairperson or dealer	[ ]	[ ]	[ ]	[ ]
14. Manufacturer's recommended use(s)	[ ]	[ ]	[ ]	[ ]
15. Availability of parts	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 14





WATERING PLANTS

Objective No. 75

Ornamental Horticulture

INTRODUCTION

No maintenance procedure for gardening and groundskeeping is more critical than that of watering. No matter whether the plant is a tree, a shrub, a bedding plant, or a lawn grass, water is essential for the plant's successful life cycle. In this learning activity package, you will learn how to water plants in the landscape.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a group of plants, portable irrigation equipment, and moisture testing device, maintain sufficient moisture around the plants for one month. Finished work must be approved by the instructor, using a checklist. All checklist statements must be rated acceptable for satisfactory performance.

LEARNING ACTIVITIES

1 READ pp. 134-139 in *The Ball Red Book.*

or

2 READ p. 61 in *Landscaping the Home and School Grounds.*

or

3 READ the section on watering turf on pp. 151-155 in *Turf Management Handbook.*

or _____

4 OBSERVE figures 10-11 through 10-15 and study the captions under each in *Turf Management Handbook.*

5 READ the sections "Watering" and "Methods of Applying Water" on pp. 243-245 in *Greenhouse Flowers and Bedding Plants for Agribusiness Studies.*

or

6 READ the section "Watering Lawns" on pp. 52-55 in *Turfgrass Maintenance and Establishment.*

or _____

7 READ the Instructions, WATERING PLANTS.

8 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

9 ARRANGE with your instructor to complete this package by going through the Check-Out Activity.

SAFETY

Not applicable.

EQUIPMENT NEEDED

1 Water hose(s)
2 Oscillating sprinkler
3 Rotary type sprinkler
4 Adjustable type rotary sprinkler
5 Tin cans
6 Soil auger

MATERIALS NEEDED

1 Water source

INSTRUCTIONS

WATERING PLANTS

(1) Determine amount of water needed for plants.

(2) Determine soil type and slope.

(3) Determine if plants are established or newly planted.

(4) Check equipment for proper working order.

(5) Set up watering equipment for proper coverage.

(6) Turn on water and check for runoff.

(7) Regulate water flow.

(8) Check area frequently to maintain amount of water.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

WATERING PLANTS

Answer the following:

1. The process of watering is sometimes difficult because there are no exact rules for watering.

   True ___ False ___

2. In watering, the soil should be wet thoroughly to a depth of

   (a) 3 inches (7.62 cm)
   (b) 5-6 inches (12.70-15.24 cm)
   (c) 8-10 inches (20.32-25.40 cm)
   (d) 24-48 inches (60.92-121.92 cm)

3. Generally, the best time of day to water would be

   (a) noon
   (b) early morning
   (c) late afternoon
   (d) any time of day

4. Which of the following would be a factor in determining how much water to use?

   (a) leaf color of plant
   (b) stem color of plant
   (c) soil color
   (d) soil type

5. It is better to water thoroughly once a week than to water a little every day.

   True ___ False ___

6. To water a long narrow bed, use

   (a) a rotary sprinkler
   (b) a hand pail
   (c) an oscillating sprinkler
   (d) the flood method

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CORRECT RESPONSES

1. True 2. (c) 3. (b) 4. (d) 5. True 6. (c)

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, WATERING PLANTS.

Water for one month a group of plants identified by your instructor.

DO NOT WRITE ON THIS SHEET

LAP 14

Student _____

Date _____

WATERING PLANTS

Instructor's Final Checklist

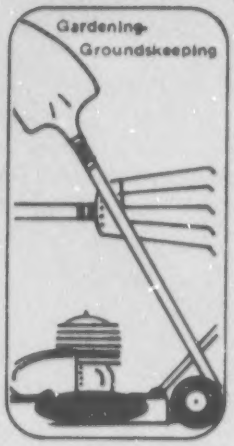
Check the student's performance in the following elements of watering plants.

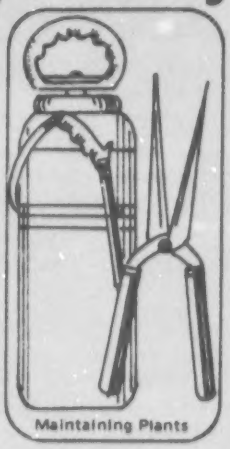
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Watered plants only when necessary.	[ ]	[ ]	[ ]	[ ]
2.	Applied water around plants at rate of absorption by soil.	[ ]	[ ]	[ ]	[ ]
3.	Maintained moisture level of soil around plants at 6 to 8 inches (15.24 to 20.32 cm).	[ ]	[ ]	[ ]	[ ]
4.	Watered plants in early morning.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.15





PLANTING ANNUAL FLOWERS

Objective No. 53

Ornamental Horticulture

INTRODUCTION

Annual flowers are used extensively in the landscape to provide color in beds, etc. These plants are grown in small flats or market packs prior to transplanting them to the flower beds. The actual procedure of planting these annual flowers to the beds is critical and one that should be carefully completed. In this learning activity package, you will learn how to plant annual flowers.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVES

Given annual plants in containers, a seedbed, water supply, and access to planting tools, plant annual flowers. The leaves, stems, and roots of the plants must not be broken during the planting process. A visual inspection after six hours must show that plants have not wilted.

LEARNING ACTIVITIES

1 READ "Removing Seedlings from Seed Flats" on p. 237 in *Greenhouse Flowers and Bedding Plants for Agribusiness Studies.*

or

2 READ the section "Planting Herbaceous Plants" on p. 56 of *Landscape Maintenance and Establishment – A Student Handbook.*

or

3 READ the section "Transplanting Herbaceous Plants" on p. 278 of *Fundamentals of Horticulture.*

or

4 READ the sections "Transplanting the Weather" and "Use of Water and Starter Solutions in Transplanting" on pp. 280-281 of *Fundamentals of Horticulture*, 1975 ed.

or _____

5 READ the instructions.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Planting Annual Flowers."

7 ARRANGE with your instructor to complete this module by going through the Check-Out Activities.

SAFETY

Follow correct safety procedures in starting and using roto-tiller.

TOOLS AND EQUIPMENT NEEDED

1. Iron rake and/or fan rake
2. Water hose
3. Seedling nozzle
4. Planting trowel
5. Dibble
6. Drop-type fertilizer spreader
7. Rotor-tiller

MATERIALS AND SUPPLIES NEEDED

1. Water source
2. Flat(s) of annual flowers
3. Fertilizer (5-10-10 or 6-12-12)

INSTRUCTIONS

PLANTING ANNUAL FLOWERS

(1) Check soil for proper moisture and mixture, using nursery operator's criteria.

(2) Dig hole to about twice width of root ball, and slightly deeper than root ball.

(3) Cut both sides of container for removal of plant. Remove each plant just prior to planting.

(4) If root ball is compacted, pull root ends from ball without damage to roots.

(5) Set plant into hole and fill it under root ball and around sides of root ball. Top of root ball should be flush with contour of seedbed.

(6) Soak filled hole with water.

(7) Construct shading device to protect plant from hot sun.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

PLANTING ANNUAL FLOWERS

Answer the following:

1. The annual plants should be removed from the flat before planting so that they have time to adapt to an environment different from that of the seedling container.

   True____ False____

2. Most annual flowers are used in the landscape because they bloom until January in all sections of the Southeast United States.

   True____ False____

3. Which of the following is a good fertilizer recommendation for annual flowers?

   a. 2 lbs./100 ft. of 16-4-8
   b. 4 lbs./1000 ft. of 5-10-10
   c. 2 lbs./100 ft. of 5-10-10 or 6-12-12
   d. 4 lbs./100 ft. of 5-10-10 or 6-12-12

4. The hole for planting should be about twice the width of the root ball and slightly deeper than the root ball.

   True____ False____

5. The plants should be pulled by hand from the flats for planting to the bed.

   True____ False____

6. Most annual flowers need to have water poured around the root ball prior to covering the root ball with soil.

   True____ False____

CORRECT RESPONSES

1. False 2. False 3. (c) 4. True 5. False 6. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

A seedbed has been prepared for you. In it, plant annual flowers which are stored in containers.

DO NOT WRITE ON THIS SHEET

LAP 15

Student _____

Date _____

PLANTING ANNUAL FLOWERS

Instructor's Final Checklist

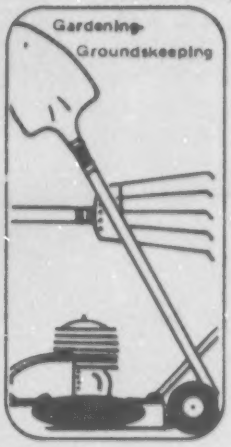
Check the student's performance in the following elements of planting annual flowers.

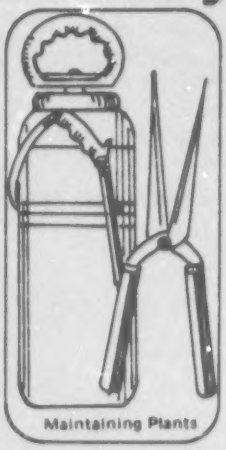
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Removed plants from flats just prior to planting.	[ ]	[ ]	[ ]	[ ]
2. Pried plants from flats carefully with fingers or some small object.	[ ]	[ ]	[ ]	[ ]
3. Watered plants correctly when planting.	[ ]	[ ]	[ ]	[ ]
4. Discarded broken or damaged plants.	[ ]	[ ]	[ ]	[ ]
5. Incorporated the fertilizer into the soil.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 16





TRANSPLANTING BULBS

Objective No. 54

Ornamental Horticulture

INTRODUCTION

Some of our most popular flowering ornamentals are grown from bulbs. Generally, bulbs are underground plant structures which store carbohydrates; the greater the storage of carbohydrates – the better the production of roots, stems, and flowers. In this learning activity package, you will learn how to transplant bulbs.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

Given access to planting tools and supplies, transplant bulbs 6" to 8" (15 to 20 cm) deep in a prepared bed. The bulbs must be completely covered with topsoil and set with pointed part up.

LEARNING ACTIVITIES

1 READ *Garden Magic*, pp. 161-176.

or

2 READ "Growing and Forcing Bulbs and Corms" on pp. 475–478 of *Fundamentals of Horticulture*, 1975 ed.

or

3 READ "Growing Bulbs" on pp. 260–265 of *Approved Practices in Beautifying the Home Grounds*, 3rd ed.

or _____

4 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Transplanting Bulbs".

5 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

N/A

TOOLS AND EQUIPMENT NEEDED

1 bulb planter
2 iron rake

MATERIALS AND SUPPLIES NEEDED

1 a supply of bulbs
2 water source

INSTRUCTIONS

(1) Remove bulb from package or bed, taking generous amount of soil with each bulb.

(2) Dig hole 6 to 8 inches (15 to 20 cm) deep for bulb.

(3) Place bulb in hole with pointed end in upward position.

(4) Fill hole with soil.

(5) Soak filled hole with water.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Transplant bulbs in a prepared bed.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET
TRANSPLANTING BULBS

Answer True or False.

1. All bulbs should be planted in soil that has been thoroughly worked to a depth of 12 inches. (30.5 cm)

   True ___ False ___

2. Bulbs for cut flower production should be planted in clumps because weed control is not of major importance.

   True ___ False ___

3. Daffodils should be planted about 3 – 4 inches deep. (7.6 to 10 cm)

   True ___ False ___

4. The tulip is one of the most common ornamentals grown from bulbs.

   True ___ False ___

CORRECT RESPONSES

1. True 2. False 3. False 4. True

DO NOT WRITE ON THIS SHEET

LAP 16

Student _____

Date _____

TRANSPLANTING BULBS

Instructor's Final Checklist

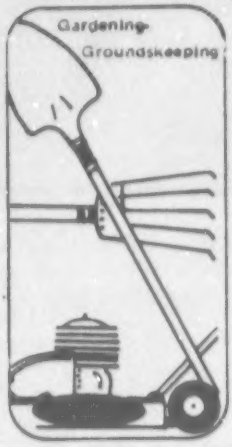
Check the student's performance in the following elements of Transplanting Bulbs.

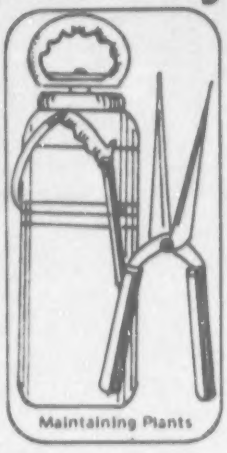
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Dug holes the correct depth for the bulb crop planted.	[ ]	[ ]	[ ]	[ ]
2. Inserted bulb with the pointed end up.	[ ]	[ ]	[ ]	[ ]
3. Covered bulbs completely with topsoil.	[ ]	[ ]	[ ]	[ ]
4. Soaked filled hole with water after planting.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 17





CHECKING PLANTS FOR INSECTS

Objective No. 47

Ornamental Horticulture

INTRODUCTION

One of the most critical maintenance practices is that of insect control. Before controlling insects, one must be able to identify the insects. Insects may attack ornamental plants in any area of the plant so the maintenance worker must know some hints for thoroughly checking all parts of the plant for insects. In this learning activity package, you will learn how to check plants for insects.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVES

Given shrubs or flowers, inspect the plants to determine if insects exist. Your conclusions must be correct as verified by your instructor.

LEARNING ACTIVITIES

1 READ "Controlling Insects and Diseases" on pp. 208-212 in *Approved Practices in Beautifying the Home Grounds.*

or

2 READ "Controlling Insects and Diseases" on p. 58 of *Landscaping the Home and School Grounds.*

or

3 READ *Insects and Diseases of Ornamentals,* Circular 502, Clemson University Extension Service, 1972.

or _____

4 STUDY carefully Table 4 on pp. 58-59 of *Landscaping the Home and School Grounds. *Note the column DESCRIPTION OF PEST!*

or _____

5 STUDY carefully "Garden Pests and Controls" on pp. 15-16 of *Landscape Maintenance; note the table which gives* insect damage or symptom.

or _____

6 READ the instructions.

7 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Checking Plants for Insects".

8 ARRANGE with your instructor to complete this package by going through the Check-Out Activities listed.

SAFETY

Watch closely for wasp nests and bees. Stings from these insects can be toxic.

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

A guide to common insects of ornamental plants.

INSTRUCTIONS

CHECKING PLANTS FOR INSECTS

(1) Check overall appearance of plant. Wilting or discoloring of leaves and branches may indicate presence of harmful insects below soil surface.

(2) Check upper and lower surfaces of leaves.

(3) Check individual branches.

(4) Check stem.

(5) Check soil around or underneath plants.

(6) If insect signs exist, a portion of the affected area might be removed for examination.

STUDENT SELF-CHECK
DO NOT WRITE ON THIS SHEET
CHECKING PLANTS FOR INSECTS

Answer the following:

1. Wilting might be an indication of insects below the soil level.

   True_____ False_____

2. A horticultural worker learns to identify insects by the type of damage that is found on the plant.

   True_____ False_____

3. The insect pest on camellia that might appear as a cottony mass on the leaves is:

   a. bagworm
   b. lacebugs
   c. aphid
   d. camellia scale

4. Leaf discoloration always shows lack of fertilizer rather than possible insect attacks.

   True_____ False_____

5. Bagworms would more likely be found on:

   a. azaleas
   b. hollies
   c. marigolds
   d. junipers and arborvitae

6. All insects are visible on plant leaves or stems.

   True_____ False_____

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

In a flower and shrub bed identified by your instructor, determine if plants are infested with insects.

CORRECT RESPONSES

1. True 2. True 3. (d) Camellia scale 4. False 5. Junipers and arborvitae 6. False

DO NOT WRITE ON THIS SHEET

LAP 17

Student _____

Date _____

CHECKING PLANTS FOR INSECTS
Instructor's Final Checklist

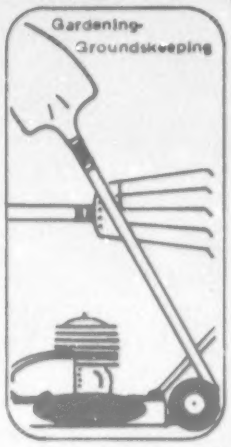
Check the student's performance in the following elements of checking plants for insects.

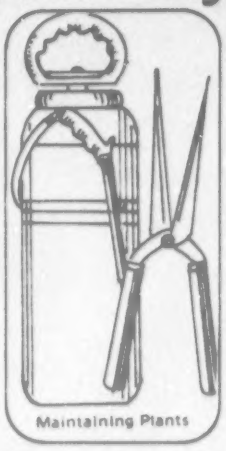
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Checked the entire leaf surfaces closely.	[ ]	[ ]	[ ]	[ ]
2. Checked all stem surfaces closely.	[ ]	[ ]	[ ]	[ ]
3. Checked the soil surface around and under the plants closely.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.18





BUILDING SUPPORT STRUCTURES FOR TRAINING VINES

Objective No. 58

Ornamental Horticulture

INTRODUCTION

Some fruit vines, such as grapes, are used as part of the ornamental landscape. These vine crops need support structures so that they may carry out their production cycle as they should. Different type structures may be used to provide the necessary support but yet blend with the surrounding landscape. In this learning activity package, you will learn how to build supporting structures for training vines.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

Given posts, braces, posthole diggers, wire, nails and staples, build a structure for training a fruit vine. The structure must be strong enough to support the weight and spread of a mature vine, and it must be durable for an extended period of time.

LEARNING ACTIVITIES

1 READ "Building Trellises, Arbors and Fences" on pp. 225–227 of *Approved Practices in Beautifying the Home Grounds.*

or _____

2 READ AND STUDY the materials about support structures that your instructor has provided for you.

or _____

3 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Building Supporting Structures for Training Vines."

4 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Follow common safety practices while using any of the tools used in constructing the support structures.

TOOLS AND EQUIPMENT NEEDED

1 posthole digger
2 hammer, claw
3 handsaw
4 sawbuck(s)
5 tamper

MATERIALS AND SUPPLIES NEEDED

1 nails
2 lumber
3 wire
4 staples
5 posts
6 braces

INSTRUCTIONS

(1) Determine desired spread of vine.

(2) Locate positions.

(3) Dig postholes.

(4) Set posts in place, fill around them with dirt and pack firmly.

(5) Set braces to posts.

(6) Stretch wire on posts and staple.

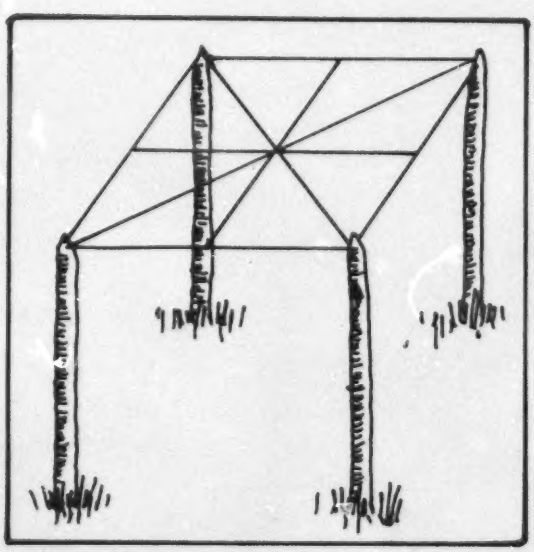


Figure 1. The "eight arm" system sometimes used for training muscadine grapes.

SAMPLE SUPPORT STRUCTURE

The type of structure required by a particular vine depends upon the type of vine and its intended uses. Grape vines, for example, are frequently used both to provide fruit and to enhance the landscape. The support structures shown here are of the type used commercially for fruit production, however, they can be used for ornamental purposes as well.

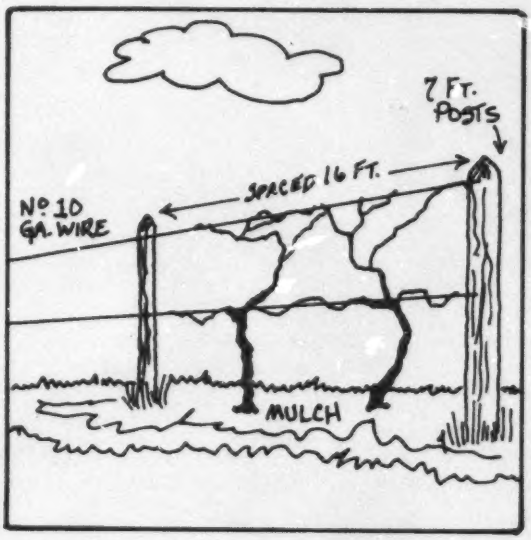


Figure 2. The "four arm" system sometimes used for training muscadine grapes.

STUDENT SELF-CHECK

BUILDING SUPPORT STRUCTURES FOR TRAINING VINES
DO NOT WRITE ON THIS SHEET
Answer True or False.

1. Never design a trellis so that it seems to be a part of the surrounding landscape.

   True ___ False ___

2. A trellis can be designed to meet the needs of the vines that are to grow on it.

   True ___ False ___

3. Sometimes, a common wire fence can be the support structure for the vines.

True —— False ——

4. The vines spread can be forced to fit any support structure that is built.

   True —— False ——

5. Support structures should not be painted for preserving because the paint is harmful to all vines.

   True —— False ——

CORRECT RESPONSES

1. False 2. True 3. True 4. False 5. False

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Build a supporting structure for training a fruit vine.

DO NOT WRITE ON THIS SHEET

LAP 18

Student _____

Date _____

BUILDING SUPPORT STRUCTURES FOR TRAINING VINES

Instructor's Final Checklist

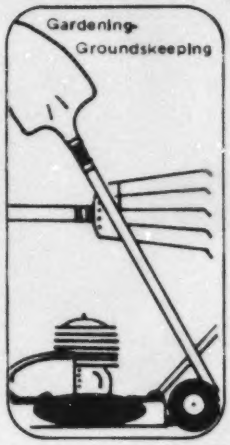
Check the student's performance in the following elements of Building Support Structures for Training Vines.

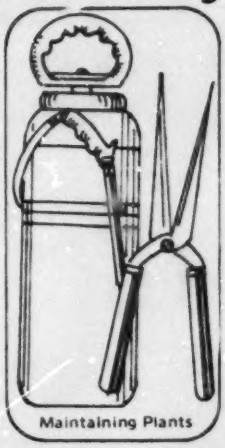
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Constructed support structure to accommodate the desired spread of the p'ant.	[ ]	[ ]	[ ]	[ ]
2. Constructed the support structure to support the weight of the mature vine.	[ ]	[ ]	[ ]	[ ]
3. Constructed the support structure to blend with the surrounding landscape.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 19





CONSTRUCTING COVERS TO PROTECT PLANTS FROM WEATHER

Objective No. 55

Ornamental Horticulture

INTRODUCTION

Late frosts can be detrimental to the landscape because new growth is usually killed by these frosts. Herbaceous plants are more susceptible to heavy damage from frost because the entire crop can be killed in one night and the landscape can be thrown completely out of balance as a result. Sometimes, protection can be provided to prevent harm from frost. In this learning activity package, you will learn how to construct covers to protect plants from weather.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

Given access to tools, materials and supplies, construct portable caps for protecting plants from frost. Each cap should completely cover its plants without any contact with leaf or stem surfaces.

LEARNING ACTIVITIES

1 READ the instructions.

2 READ the Related Information.

3 OBSERVE as your instructor demonstrates ways to construct covers.

4 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Constructing Covers to Protect Plants from Weather."

5 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Follow good cutting procedures when using knife.

TOOLS AND EQUIPMENT NEEDED

1 knife
2 hammer
3 hand saw
4 other tools as determined by instructor

MATERIALS AND SUPPLIES NEEDED

1 lumber
2 burlap
3 nails
4 plastic jugs

INSTRUCTIONS

(1) Determine type of plants to be protected.

(2) Take measurements for each cap.

(3) Layout and cut material to length and shape.

(4) Make necessary folds in materials.

(5) Form folds into caps.

(6) Store caps for later use.

RELATED INFORMATION

Early flowering plants especially fruit trees, spring bedding plants and vegetable crops will at times require some type of frost protection.

It is sometimes feasible to cover small trees and shrubs with sheets of plastic, burlap, or cloth. Small plants such as bedding plants and vegetable transplants can also be covered with such materials. It is best not to have the covers touch the plant if they are to be left on the plant during the day. Commercial prepared individual covers are available in various sizes for covering the smaller plants. Such covers can be taken up and stored after use. (see figure 1) If only a few plants are to be covered or commercial prepared covers are not available, substitutes can be made using plastic, paper or cloth covers. (see figure 2) For the smaller plants plastic or paper bags can often be used. A wood stake or wire can be used to provide a rigid support where needed. Sometimes it may be most feasible to construct a portable frame to support the plastic. (see figure 3)

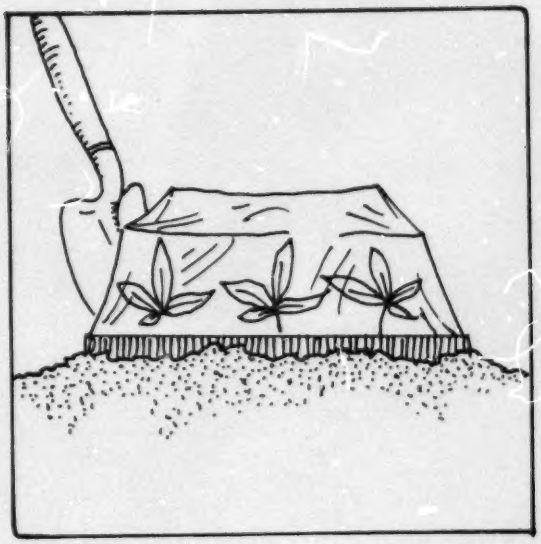


Figure 1. Commercially prepared covers called "hot caps" are sometimes used to protect new seedlings.

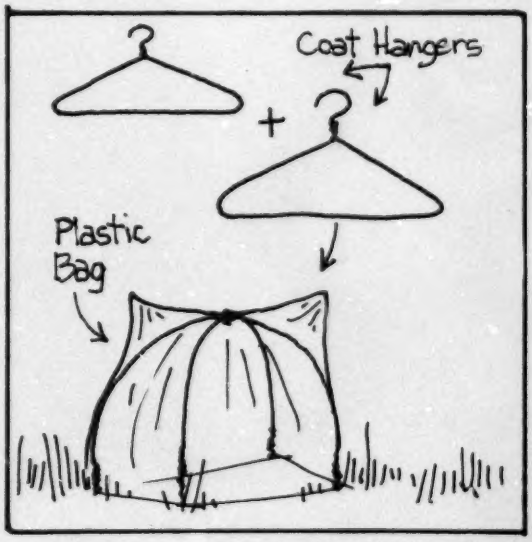


Figure 2. Coat hangers can be used to provide the frame work for small plastic covers.

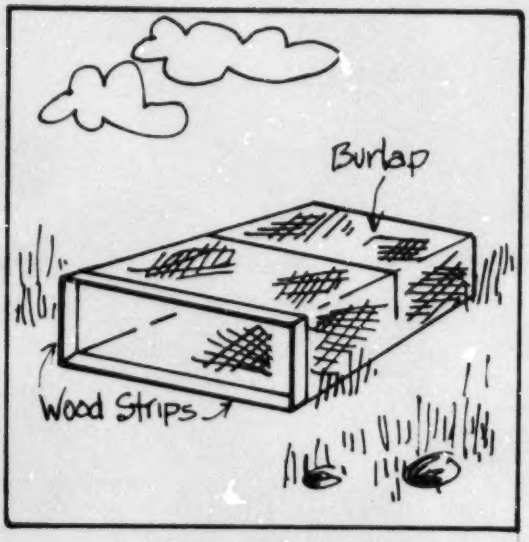


Figure 3. A small frame of almost any dimension may be put together using ½" x 2" strips (1.27 cm x 5 cm) and covered with plastic, cloth or burlap.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

CONSTRUCTING COVERS TO PROTECT PLANTS FROM WEATHER

Answer True or False.

1. Protective caps should touch leaves of plant to make sure that frost will not form.

   True ___ False ___

2. Protective caps should be removed each day to allow plants to receive sunlight.

   True ___ False ___

3. Woody plants are less susceptible to frost than herbaceous plants.

   True ___ False ___

4. Plastic jugs can be used as protective caps for small plants.

   True ___ False ___

5. Larger protective caps can be constructed using burlap as a protective material.

   True ___ False ___

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Construct portable caps for protecting plants from frost.

CORRECT RESPONSES

1. False 2. False 3. True 4. True 5. True

DO NOT WRITE ON THIS SHEET

LAP 19

Student _____

Date _____

CONSTRUCTING COVERS TO PROTECT PLANTS FROM WEATHER

Instructor's Final Checklist

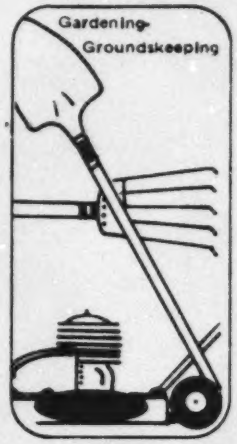
Check the student's performance in the following elements of Constructing Covers to Protect Plants from Weather.

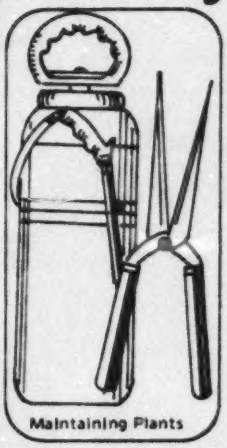
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Chose the protective cap for specific plants correctly.	[ ]	[ ]	[ ]	[ ]
2. Placed the protective cap over the plants so that it did not touch the stems or leaves.	[ ]	[ ]	[ ]	[ ]
3. Constructed protective cap as economical as possible.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.20





IDENTIFYING FLAMMABLE CHEMICALS

Objective No. 52

Ornamental Horticulture

INTRODUCTION

No one ever expects a large fire which might destroy an entire business or take away precious lives. It is imperative that all precautionary steps be taken to prevent any such fire. Horticulturists must follow fire prevention steps just as many other businesspersons. In this learning activity package, you will learn how to identify flammable chemicals.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given ten (10) labeled containers of pesticides, herbicides and fungicides, some of which are flammable, accurately identify all the flammable materials.

LEARNING ACTIVITIES

1 READ carefully the section "Labels and Labeling" on pp. 4-1 – 4-3 of *Apply Pesticides Correctly – A Guide for Commercial Applicators.*

2 READ *Fundamentals of Machine Operation – Crop Chemicals*, Deere & Company, pp. 156-157.

or_____

3 READ the Instructions.

4 STUDY the specimen label. Try to determine whether or not the chemical is flammable.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Identifying Flammable Chemicals."

6 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Handle each container carefully and wash hands thoroughly with soap and water after completing this exercise.

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

Ten (10) labeled containers of chemical pesticides.

INSTRUCTIONS

(1) Handle containers carefully.

(2) Read entire label on each container.

(3) Group the chemicals as to flammable and nonflammable.

STUDENT SELF-CHECK
DO NOT WRITE ON THIS SHEET
IDENTIFYING FLAMMABLE CHEMICALS

Answer True or False.

1. All pesticides are highly flammable.

   True ___ False ___

2. Most pesticide labels will tell whether the pesticide is flammable or not.

   True ___ False ___

3. All poisonous pesticides are not necessarily flammable.

   True ___ False ___

4. The skull and crossbones symbol is a sure sign that a pesticide is flammable.

   True ___ False ___

5. All toxic pesticides are flammable.

   True ___ False ___

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

From the chemicals provided, identify those which are flammable.

CORRECT RESPONSES

1. False 2. False 3. True 4. False 5. False

DO NOT WRITE ON THIS SHEET

LAP 20

Student _____ _____

Date _____

IDENTIFYING FLAMMABLE CHEMICALS

Instructor's Final Checklist

Check the student's performance in the following elements of

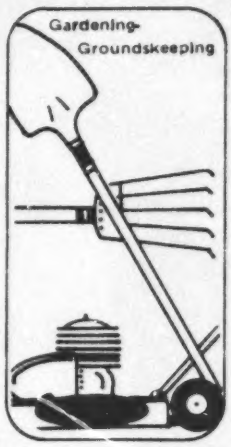
Identifying Flammable Chemicals.

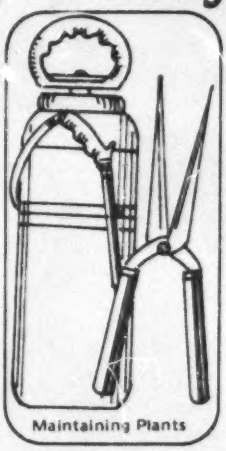
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Handled each pesticide carefully to prevent spillage.	[ ]	[ ]	[ ]	[ ]
2. Washed hands thoroughly with soap and water after handling the pesticides.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 21





STORING AGRICULTURAL CHEMICALS

Objective No. 67

Ornamental Horticulture

INTRODUCTION

To assure that pesticides cause no damage to humans, animals, or the environment, they must be stored according to directions on the pesticide label. We, as humans, are our worst enemies sometimes because we are careless. It is extremely important that careless storage of pesticides be reduced to the zero amount so that there is no harm to humans, animals, and the environment. In this learning activity package, you will learn how to store agricultural chemicals.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given ten (10) agricultural chemical containers with labels intact, list accurately the recommendations for storing the chemicals.

LEARNING ACTIVITIES

1 READ carefully the section "Labels and labeling" on pp. 4-1 – 4-3 of *Apply Pesticides Correctly – A Guide for Commercial Applicators.*

or

READ *Fundamentals of Machine Operation – Crop Chemicals,* pp. 169-170.

or

READ *Applying Pesticides,* pp. 19-22 and pp. 38-39.

or _____

2 READ the Instructions.

3 TEST YOUR KNOWLEDGE by taking the Student Self-Check "Storing Agricultural Chemicals."

4 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Wash your hands thoroughly with soap and water after completing this learning activity package.

TOOLS AND EQUIPMENT NEEDED

None

MATERIALS AND SUPPLIES NEEDED

Ten (10) agricultural chemical containers with labels intact.

INSTRUCTIONS

(1) Handle each container carefully.

(2) Group chemicals according to common storage procedures.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET
STORING AGRICULTURAL CHEMICALS

Answer True or False.

1. Any agricultural chemical in an aerosol container should be stored in a refrigerator.

   True ___ False ___

2. Agricultural chemicals should be stored before even reading the label.

   True ___ False ___

3. All labels on agricultural chemicals are required by law to contain safe storage procedures.

   True ___ False ___

4. The first step when using agricultural chemicals is to read the label.

   True ___ False ___

5. The safest way to store left-over agricultural chemicals is to burn them.

   True ___ False ___

CORRECT RESPONSES

1. False 2. False 3. True 4. True 5. False

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Ten agricultural chemical containers will be provided by your instructor. List the recommendations for storing each.

DO NOT WRITE ON THIS SHEET

LAP 21

Student _____

Date _____

STORING AGRICULTURAL CHEMICALS

Instructor's Final Checklist

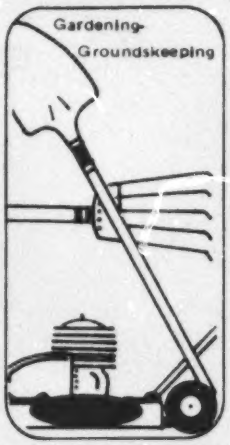
Check the student's performance in the following elements of Storing Agricultural Chemicals.

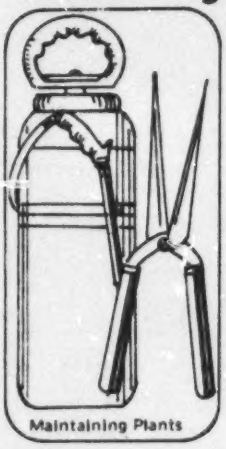
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Handled each agricultural chemical carefully to prevent spillage.	[ ]	[ ]	[ ]	[ ]
2. Washed hands thoroughly with soap and water after handling the chemicals.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 22





APPLYING CHEMICAL TREATMENTS

TO

DISEASED PLANTS

Objective No. 41

Ornamental Horticulture

INTRODUCTION

Control of plant diseases is a must in producing picturesque landscapes. The most commonly used disease control is chemical treatment. Every horticultural worker must have experience in applying chemical treatments to diseased plants. In this learning activity package, you will learn how to apply chemical treatments to diseased plants.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given diseased plants and chemical treatment charts, apply a chemical which will correct diseased areas on the plants. The chemical used must not be allowed to come in contact with surrounding livestock or sources of water and food supplies.

LEARNING ACTIVITIES

1 STUDY carefully the table on p. 19 of *Landscape Maintenance.*

or

2 STUDY carefully the chart on p. 213 of *Approved Practices in Beautifying the Home Grounds.*

or

3 STUDY carefully table 5 on p. 60 of *Landscaping the Home and School Grounds.*

or _____

4 READ AND STUDY carefully the "Safety Checklist" on p. 27 of *Landscape Maintenance and Establishment - A Student Handbook.*

or _____

5 READ relevant sections of *Insects and Disease of Ornamentals,* Circular 502, Clemson University Extension Service, 1972.

or

6 READ section 5 of *Apply Pesticides Correctly – A Guide for Commercial Applicators.*

or

7 READ *Applying Pesticides*, AAVIM, 1976, pp. 40-46; note especially page 46.

or _____

8 READ the Instructions, APPLYING CHEMICAL TREATMENTS TO DISEASED PLANTS.

9 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

10 ARRANGE with your instructor to complete this package by going through the Check-Out Activity.

SAFETY

Follow all safety precautions as prescribed for use of pesticides.

EQUIPMENT NEEDED

1 Compressed-air hand sprayer
2 Hand duster
3 Hose-end sprayer
4 Protective mask
5 Chemical resistant gloves
6 Coveralls

MATERIALS NEEDED

1 A supply of chemical pesticides
2 A source of water

INSTRUCTIONS

APPLYING CHEMICAL TREATMENTS TO DISEASED PLANTS

1. Determine needed chemical.
2. Read manufacturer's instructions for using chemical.
3. Evaluate weather conditions, such as wind direction, velocity, and shower activity.
4. Prepare chemical for use.
5. Determine equipment to use in application of chemical.
6. If sprayer is used, prepare for use in application of chemical.
7. Spray upper and lower surfaces of affected area.
8. Dispose of chemical container, following state regulations.
9. Dispose of excess chemical, following state regulations.
10. Store chemical, following state regulations.
11. Clean spray equipment with water.
12. Thoroughly cleanse exposed skin areas with soap and water.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

APPLYING CHEMICAL TREATMENT TO DISEASED PLANTS

Answer the following:

1. The first step in use of pesticides is

   (a) put on rubber gloves
   (b) fill the sprayer with water
   (c) read the pesticide label
   (d) put on protective mask

2. The best control for leaf gall is to dust with captan.

   True ___ False ___

3. Black spot is a common disease on

   (a) azaleas
   (b) roses
   (c) petunias
   (d) marigolds

4. It is safe to smoke filtered cigarettes while applying chemicals for disease control.

   True ___ False ___

5. Old soft drink bottles are ideal for storing left-over chemicals after application.

   True ___ False ___

6. Chemicals used for plant disease control could easily be harmful to pets and wildlife.

   True ___ False ___

7. The best way to dispose of old chemical containers is to place them in a closed trash can.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, APPLYING CHEMICAL TREATMENTS TO DISEASED PLANTS.

Certain plants which are diseased have been identified. Apply a chemical which will eliminate the disease.

CORRECT RESPONSES

1. (c) 2. False 3. (b) 4. False 5. False 6. True 7. False

DO NOT WRITE ON THIS SHEET

LAP 22

Student _____

Date _____

APPLYING CHEMICAL TREATMENT TO DISEASED PLANTS

Instructor's Final Checklist

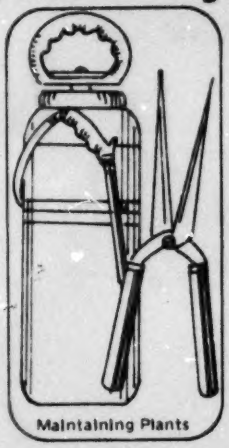
Check the student's performance in the following elements of applying chemical treatment to diseased plants.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Read the chemical label carefully before using the chemical.	[ ]	[ ]	[ ]	[ ]
2. Mixed the chemicals in a well-ventilated area.	[ ]	[ ]	[ ]	[ ]
3. Checked wind conditions before applying the chemical.	[ ]	[ ]	[ ]	[ ]
4. Applied the chemical thoroughly to all surfaces of the plant(s).	[ ]	[ ]	[ ]	[ ]
5. Disposed used chemical containers correctly.	[ ]	[ ]	[ ]	[ ]
6. Followed correct cleanup procedures of body care after using the chemicals (i.e. washing hands and exposed body parts with soap and water).	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 23



APPLYING CHEMICAL TREATMENT TO PLANTS INFESTED WITH INSECTS

Objective No. 42

Ornamental Horticulture

INTRODUCTION

Most insect pests harm plants by either sucking or chewing. Knowing how the insect does its damage is vital in controlling the insect. Different types of chemicals have to be used according to how the insect damages the plant. Horticultural workers must be familiar with chewing and sucking insect controls so that efficient controls can be applied. In this learning activity package, you will learn how to apply chemical treatment to plants infested with insects.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given plants infested with either chewing or sucking insects, apply a chemical which will kill the identified insects. The plant growth must not be retarded by the chemical treatment. The chemical used must not be allowed to come in prolonged contact with skin, or drift to animals, food sources, or water-sources.

LEARNING ACTIVITIES

1 READ "Insect and Disease Control" on pp. 25-26 of *Landscape Maintenance and Establishment - A Student Handbook.*

or _____

2 STUDY carefully the "Safety Checklist for Applying Herbicides and Pesticides" on p. 27 of *Landscape Maintenance and Establishment - A Student Handbook.*

or

3 STUDY carefully "Garden Pests and Controls" and "Pest Chart" on pp. 15-16 of *Landscape Maintenance.*

or

4 READ "Controlling Insects and Diseases of Ornamentals" on p. 58 of *Landscaping the Home and School Grounds.*

or

5 READ "Controlling Insects and Diseases" on pp. 208-215 of *Approved Practices in Beautifying the Home Grounds.*

or

6 READ *Applying Pesticides,* AAVIM, 1976, pp. 40-46; note especially page 46.

or

7 READ relevant sections of *Insects and Diseases of Ornamentals,* Circular 502, Clemson University Extension Service, 1972.

or

8 READ *Apply Pesticides Correctly – A Guide for Commercial Applicators,* section 5.

or _____

9 READ the Instructions, APPLYING CHEMICAL TREATMENT TO PLANTS INFESTED WITH INSECTS.

10 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

11 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Follow all safety precautions as prescribed for use of pesticides.

EQUIPMENT NEEDED

1 Compressed-air hand sprayer
2 Hand duster
3 Hose-end sprayer
4 Protective mask
5 Chemical resistant gloves
6 Coveralls

MATERIALS NEEDED

1 A supply of insecticides
2 An insecticide chart showing recommended insecticides for specific insects
3 A source of water

INSTRUCTIONS

APPLYING CHEMICAL TREATMENT TO PLANTS

(1) Determine required chemical, using diagnostic charts which show type chemical to be used with given plants.

(2) Read label to determine use of chemical.

(3) Mix chemical according to directions, if required.

(4) Prepare sprayer for application of chemical.

(5) Spray plants, using manufacturer's instructions for operating sprayer. Cover all pests, and upper and lower leaf surfaces.

(6) Dispose of empty containers, following state regulations.

(7) Dispose of excess chemical, following state regulations.

(8) Store chemical, following state regulations.

(9) Clean all equipment with water.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

APPLYING CHEMICAL TREATMENT TO PLANTS INFESTED WITH INSECTS

Answer the following:

1. The reproductive habits of insects must be known in order to use the proper controls.

   True ___ False ___

2. Insecticides that are absorbed by the plants in large enough quantities to kill those insects that are feeding upon the plants are

   (a) wettable powders
   (b) contact insecticides
   (c) systemic insecticides
   (d) oil emulsions

3. Spider mites or red mites can be controlled by using Maneb.

   True ___ False ___

4. The best time of day to apply dust is at

   (a) mid-day
   (b) early afternoon
   (c) mid-morning or mid-afternoon
   (d) early morning or late afternoon

5. Sprays may be applied at any time of day if it is not raining and the wind is calm.

   True ___ False ___

6. Leaf hoppers may be a problem on most any shrub.

   True ___ False ___

7. If the insecticide label suggests using 1 teaspoon/gal H_2O of an insecticide, it is better to use twice that amount to assure that the insects are well controlled.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, APPLYING CHEMICAL TREATMENT TO PLANTS INFESTED WITH INSECTS.

Apply a chemical which will kill the identified insects on given plants.

CORRECT RESPONSES

1. False 2. (c) 3. False 4. (d) 5. True 6. True 7. False

DO NOT WRITE ON THIS SHEET

LAP 23

Student _____

Date _____

APPLYING CHEMICAL TREATMENT TO PLANTS INFESTED WITH INSECTS

Instructor's Final Checklist

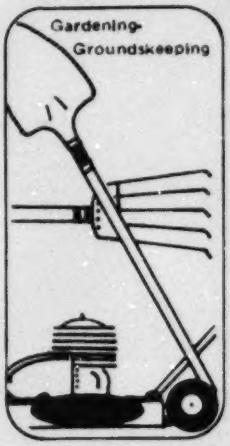
Check the student's performance in the following elements of applying chemical treatment to plants infested with insects.

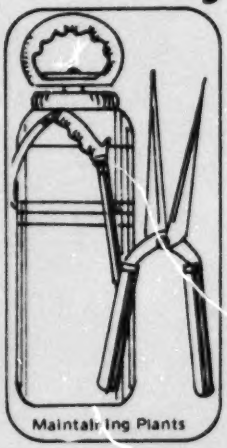
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Read the chemical label carefully before using the chemical.	[ ]	[ ]	[ ]	[ ]
2. Mixed the chemicals in a well-ventilated area.	[ ]	[ ]	[ ]	[ ]
3. Checked wind conditions before applying the chemical.	[ ]	[ ]	[ ]	[ ]
4. Applied the chemical thoroughly to all surfaces of the plant(s).	[ ]	[ ]	[ ]	[ ]
5. Disposed of used chemical containers correctly.	[ ]	[ ]	[ ]	[ ]
6. Followed correct clean-up procedures of body care after using the chemicals (i.e. washing hands and exposed body parts with soap and water).	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 24





APPLYING WEED KILLING COMPOUNDS TO LAWNS WITH A COMPRESSED AIR SPRAYER

Objective No. 43

Ornamental Horticulture

INTRODUCTION

Nothing in the landscape is more unsightly than having weeds growing in the lawn. Most weeds can be controlled by correctly using some type of herbicide. Some weeds are controlled simply by practicing good lawn maintenance such as fertilizing regularly and mowing regularly but still there are those weeds that are controlled only by using weed killers (herbicides). In this learning activity package, you will learn how to apply weed killing compounds to lawns with a compressed-air sprayer.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or,

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a lawn with specific kinds of weeds and a portable compressed-air sprayer, apply a weed killing compound over all areas of the lawn. Permanent grasses and plants must not be damaged by the chemical. Uniform coverage must be evident by dead or dying weeds.

LEARNING ACTIVITIES

1 READ "Controlling Weeds in Turf" on pp. 174-196 of *Turf Management Handbook.*

or

2 READ "Turfgrass Weeds" on pp. 55-56 of *Turfgrass Maintenance and Establishment – A Student Handbook.*

or

3 STUDY the selection on weed identification on pp. 57-83 of *Turfgrass Maintenance and Establishment – A Student Handbook.*

or

4 READ *Applying Pesticides,* AAVIM, 1976, pp. 40-46; note especially page 46.

or _____

5 READ the Instructions, APPLYING WEED KILLING COMPOUNDS TO LAWNS WITH A COMPRESSED AIR SPRAYER.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

7 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

TOOLS AND EQUIPMENT NEEDED

1. Compressed-air sprayer
2. Chemical resistant gloves

MATERIALS AND SUPPLIES NEEDED

1. A supply of herbicides
2. A source of water

SAFETY

Follow all safety precautions as prescribed for use of pesticides.

INSTRUCTIONS

APPLYING WEED KILLING COMPOUNDS TO LAWNS WITH A COMPRESSED AIR SPRAYER

1. Determine kinds of weeds.
   Determine required chemical, using diagnostic charts which show type chemical to use with given weeds.
2. Read chemical label to determine proper use of chemical.
3. Mix chemical, if required.
4. Prepare sprayer for application of chemical as follows:
   a. Remove sprayer pump and plunger by turning counterclockwise until free. Pull plunger/pump out.
   b. Fill sprayer
   c. Place pump and plunger in tank and tighten by turning clockwise.
   d. Fill tank with air by pumping plunger up and down.
   e. Adjust nozzle to desired spray mist.
5. Thoroughly wet all weeds with spray mist, covering upper and lower surfaces of foliage while following directions for rate of application.
6. Dispose of excess chemical according to directions.
7. Clean spray equipment with water.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

APPLYING WEED KILLING COMPOUNDS TO LAWNS WITH A COMPRESSED-AIR SPRAYER

1. Centipede sprigs growing in a bermuda lawn are weeds.

   True_____ False_____

2. Probably one of the most common broad-leafed weeds in lawns is

   (a) crabgrass
   (b) wild onion
   (c) foxtail
   (d) dandelion

3. All broad-leafed weeds usually can be controlled by using

   (a) benlate
   (b) 2, 4-D
   (c) sevin
   (d) paraquat

4. A herbicide treatment applied to existing weeds is a pre-emergence treatment.

   True_____False_____

5. The first step of weed control is identifying the weed.

   True_____ False_____

6. Another name for Dicamba is

   (a) 2, 4-D
   (b) Silvex
   (c) DCPA
   (d) Banvel

CORRECT RESPONSES

1. True 2. (d) 3. (b) 4. False 5. True 6. (d)

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

A lawn area contains numerous undesirable weeds. Apply a weed killing compound, using a portable compressed-air sprayer.

DO NOT WRITE ON THIS SHEET

LAP 24

Student _____

Date _____

APPLYING WEED KILLING COMPOUNDS TO LAWNS WITH A COMPRESSED-AIR SPRAYER
Instructor's Final Checklist

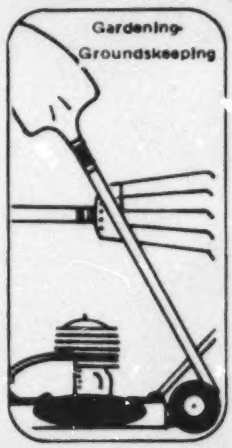
Check the student's performance in the following elements of applying weed killing compounds to lawns with a compressed-air sprayer.

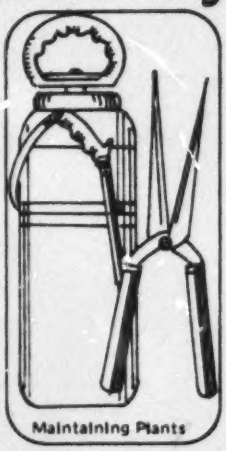
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Read the chemical label carefully before using the chemical.	[ ]	[ ]	[ ]	[ ]
2. Mixed the chemicals in a well-ventilated area.	[ ]	[ ]	[ ]	[ ]
3. Checked wind conditions before applying the chemical.	[ ]	[ ]	[ ]	[ ]
4. Applied the chemical thoroughly to all surfaces of the plant(s).	[ ]	[ ]	[ ]	[ ]
5. Disposed of used chemical containers correctly.	[ ]	[ ]	[ ]	[ ]
6. Followed correct clean-up procedures of body care after using the chemicals (i.e. washing hands and exposed body parts with soap and water).	[ ]	[ ]	[ ]	[ ]
7. Wet all weeds thoroughly with spray mist; this includes upper and lower surfaces of the foliage.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 25





APPLYING WEED KILLING COMPOUNDS TO LAWNS

Objective No. 44

Ornamental Horticulture

INTRODUCTION

A weed is commonly defined as a plant growing where it is not wanted. One of the most common tasks in landscape maintenance or groundskeeping is that of weed control in lawns. Some weeds can be controlled simply by using good mowing practices; but to achieve total success in weed control, one will more than likely use chemicals to control the weeds. In this learning activity package, you will learn how to apply weed killing compounds to lawns.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a lawn with weeds and a sprayer mounted on a tractor, apply a weed killing compound over all areas of the lawn. Permanent grasses and plants must not be damaged by the chemical.

LEARNING ACTIVITIES

1 READ "Weed Control" on p. 68 of *Landscaping the Home and School Grounds.*

or

2 READ "Turfgrass Weeds" on pp. 55-83 of *Turfgrass Maintenance and Establishment.*

or

3 READ "Weeds and Control" on p. 20 of *Landscape Maintenance.*

or

4 READ "Chemical Control" on pp. 176-196 of *Turf Management Handbook.*

or

5. READ *Fundamentals of Machine Operation – Crop Chemicals,* pp. 128-133, Deere and Co., 1976.

or _____

6 READ the Instructions. APPLYING WEED KILLING COMPOUNDS TO LAWNS.

7 OBSERVE carefully as your instructor demonstrates how to calibrate a sprayer.

8 STUDY the "Weed Control Recommendations" on pp. 69-73 of *Landscaping the Home and School Grounds.*

or _____

9 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

10 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Follow all safety procedures for handling mixing and disposing of chemical containers.

TOOLS AND EQUIPMENT NEEDED

1. Sprayer apparatus (power sprayer)
2. Tractor (if needed)
3. Rubber gloves
4. Gas mask

MATERIALS AND SUPPLIES NEEDED

1. A supply of herbicides
2. Diagnostic charts
3. A water supply

INSTRUCTIONS

APPLYING WEED KILLING COMPOUNDS TO LAWNS

(1) Identify weeds.

(2) Determine required chemical, using diagnostic charts which show type chemical to use with given weeds.

(3) Read chemical label to determine proper use of chemical.

(4) Mix chemical, if required.

(5) Pour solution into sprayer tank.

(6) Calibrate sprayer for correct mist.

(7) Spray all lawn area, using manufacturer's instructions for operating sprayer and tractor.

(8) Dispose of empty containers, following state regulations.

(9) Dispose of excess chemical, following state regulations.

(10) Store chemical, following state regulations.

(11) Thoroughly cleanse equipment with water.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

APPLYING WEED KILLING COMPOUNDS TO LAWNS

1. A common herbicide used to control broadleaf weeds in lawns is dalapon. True False

2. The best form of 2, 4-D to be used in weed control is the amine form. True False

3. Paraquat is frequently used as a selective weed control in lawns. True False

4. One of the most common broadleaf weeds (has a yellow flower) in lawns is the dandelion. True False

5. Methyl bromide is an excellent herbicide to use in a tractor-mounted sprayer. True False

6. The first step in weed control is to choose the chemical to be used for control. True False

7. A selective herbicide must be used if the herbicide is applied to an established lawn. True False

8. Even though it can be used as a lawn grass, crabgrass can be a common weed in lawns. True False

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CORRECT RESPONSES

1. False 2. True 3. False 4. True
5. False 6. False 7. True 8. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through each activity, your instructor will rate your performance using the Instructor's Final Checklist.

Apply a weed killing compound over lawn areas using a tractor-mounted sprayer.

DO NOT WRITE ON THIS SHEET

LAP 25

Student _____

Date _____

APPLYING WEED KILLING COMPOUNDS TO LAWNS

Instructor's Final Checklist

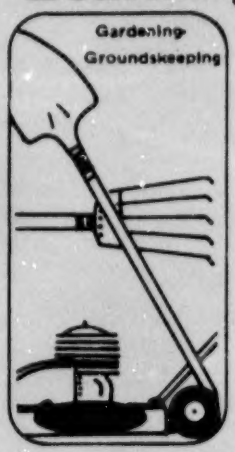
Check the student's performance in the following elements of applying weed killing compounds to lawns.

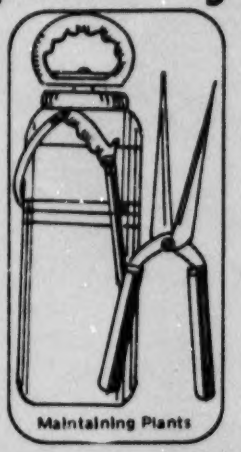
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Calibrated the sprayer apparatus correctly	[ ]	[ ]	[ ]	[ ]
2.	Selected a suitable herbicide for use in the exercise	[ ]	[ ]	[ ]	[ ]
3.	Observed all safety practices in mixing and applying the herbicide	[ ]	[ ]	[ ]	[ ]
4.	Disposed of empty chemical containers according to state regulations	[ ]	[ ]	[ ]	[ ]
5.	Stored chemicals according to state regulations	[ ]	[ ]	[ ]	[ ]
6.	Cleaned the sprayer apparatus thoroughly upon completion of the exercise	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 26





ADDING MULCH TO NEW SEEDLINGS

Objective No. 40

Ornamental Horticulture

INTRODUCTION

Plants growing in the wild naturally mulch themselves with fallen leaves. From this statement you can see that mulch is some type of substance spread on the ground around plants. There are some procedures and information that a horticultural worker should know about mulches and applying them to ornamental plants. In this learning activity package, you will learn how to add mulch to new seedlings.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a bed of seedlings, bark mulching materials, and necessary tools, add mulch around plants to a depth of 2 to 3 inches (5.08 to 7.62 cm) extending laterally to a distance equal to the diameter of plant top growth.

LEARNING ACTIVITIES

1 READ "Mulches and Mulching" on p. 44 of *Landscaping the Home and School Grounds.*

or

2 READ "Soil Conditions and Mulches" on p. 5 of *Landscape Maintenance.*

or

3 READ *Care of Shrubs and Trees,* Circular 430, 1978, pp. 16-17.

or

4 READ "Mulching Landscape Plants" on p. 24 of *Landscape Maintenance and Establishment - A Student Handbook.*

or

5 READ "Mulch the Seeded Area" on p. 94-95 of *Approved Practices in Beautifying the Home Grounds.*

or _____

6 READ the Instructions, ADDING MULCH TO NEW SEEDLINGS.

7 STUDY the table (Mulching Materials) on p. 45 of *Landscaping the Home and School Grounds.*

or _____

8 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

9 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

EQUIPMENT NEEDED

1 Wheelbarrow
2 Shovel(s)
3 Broom rake
4 Iron rake
5 Hoe(s)

MATERIALS NEEDED

Mulching material

INSTRUCTIONS

ADDING MULCH TO NEW SEEDLINGS

(1) Prepare soil for mulch, if required.

(2) Spread mulch over area.

(3) Add excess mulch to allow for settling.

(4) Smooth top of mulch if necessary.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

ADDING MULCH TO NEW SEEDLINGS

Answer the following:

1. Mulching materials are usually

   a. heavy
   b. light
   c. organic
   d. inorganic

2. The greatest advantage of a mulch is

   a. appearance
   b. conservation of water
   c. plant protection
   d. cost

3. If fresh sawdust is used as a mulch, you can expect _____ to be tied up and not released to the plants.

   a. nitrogen
   b. potassium
   c. potash
   d. oxygen

4. If mulches are used, plants need to be watered

   a. more often
   b. less often
   c. not at all
   d. every day

5. The four main benefits of mulching are conservation of moisture, erosion control, weed control, and plant protection.

   True ___ False ___

6. One disadvantage of mulching is that some mulching materials can be fire hazards.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, ADDING MULCH TO NEW SEEDLINGS.

Mulch correctly all seedlings in a bed prepared by your instructor.

CORRECT RESPONSES

1. c 2. b 3. a 4. b 5. True 6. True

DO NOT WRITE ON THIS SHEET

LAP 26

Student _____

Date _____

ADDING MULCH TO NEW SEEDLINGS

Instructor's Final Checklist

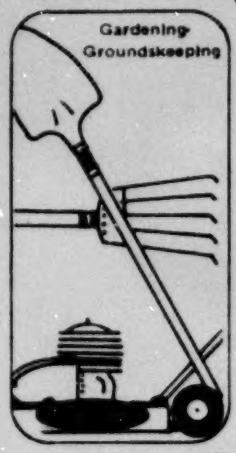
Check the student's performance in the following elements of adding mulch to new seedlings.

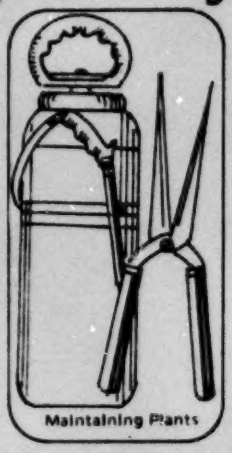
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Prepared the soil adequately before applying mulch.	[ ]	[ ]	[ ]	[ ]
2.	Applied the mulch to a depth of 2-3" (5.08-7.62 cm) around the plants.	[ ]	[ ]	[ ]	[ ]
3.	Smoothed the top of the mulch appropriately.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 27





REMOVING GRASS AND WEEDS FROM FLOWER BEDS

Objective No. 48

Ornamental Horticulture

INTRODUCTION

Most weed control in flower beds is done simply by hand cultivation. It is important to select the correct cultivating tool to get the job done but yet not injure the flowers that are growing in the bed. Sometimes no tool is needed – just simply pull the grass and weeds by hand. In this learning activity package, you will learn how to remove grass and weeds from flower beds.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activities.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVES

Given the necessary tools, remove grass and weeds from flower beds. The permanent plants and shrubs must not be damaged and the edge line must be within ± 1" of the original line. The topsoil must be left smooth and flowers should not be bruised or uprooted.

LEARNING ACTIVITIES

1 OBSERVE as your instructor demonstrates how to edge a flower bed.

or _____

2 READ "Edging the Lawn" on pp. 116-117 of *Approved Practices in Beautifying the Home Grounds.*

or _____

3 REVIEW the equipment list for cultivating and leveling on p. 34 of *Landscape Maintenance.*

or _____

4 OBSERVE closely as your instructor demonstrates and identifies tools for hand cultivation.

5 READ the instructions.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Removing Weeds and Grass from Flower Beds".

7 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Not applicable

TOOLS AND EQUIPMENT

1. Hoe
2. Weeder
3. Wheelbarrow
4. Rake
5. Hose (if needed)
6. Hand edger

MATERIALS AND SUPPLIES NEEDED

1. String for edging
2. Water supply (if needed)

INSTRUCTIONS

REMOVING GRASS AND WEEDS FROM FLOWER BEDS

(1) Stretch string along flower bed edge approx. 1" (2.5 cm) above ground level.

(2) Make vertical cuts along edge, following line of string.

(3) Remove string.

(4) Determine hardness of soil. If soil is hard, soften with sprinkled water.

(5) Take shallow, short strokes with hoe to uproot weeds and grass.

(6) Using hoe, rake weeds and grass to edge of bed.

(7) Dispose of weeds and grass.

(8) Add new soil in holes created by uprooting weeds and grass.

(9) Rake surface of flower bed with hoe or rake until smooth.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS PAGE!

REMOVING GRASS AND WEEDS FROM FLOWER BEDS

1. The ideal soil conditions for weeding flower beds is dry and hard.

   True_____False_____

2. If using a hoe to uproot weeds in the flower bed, make shallow strokes to prevent injury to flower roots.

   True_____False_____

3. Any holes created by the weeding process should be filled with mulch material.

   True_____False_____

4. The weeds and grass can be left lying in the flower beds because it will make good mulching material.

   True_____False_____

5. The flower beds should be raked lightly after weeding.

   True_____False_____

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Remove grass and weeds from a flower bed.

CORRECT RESPONSES

1. False 2. True 3. False 4. False
5. True

DO NOT WRITE ON THIS SHEET

LAP 27

Student _____

Date _____

REMOVING GRASS AND WEEDS FROM FLOWER BEDS

Instructor's Final Checklist

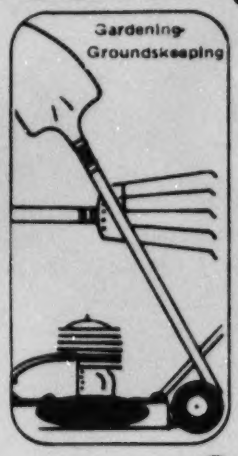
Check the student's performance in the following elements of removing grass and weeds from flower beds.

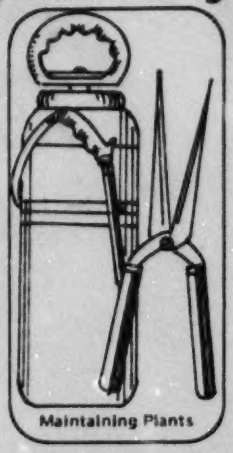
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Edged flower beds neatly by using string as a guide.	[ ]	[ ]	[ ]	[ ]
2. Made short, shallow strokes with hoes to prevent injury to the flowers.	[ ]	[ ]	[ ]	[ ]
3. Disposed of weeds properly.	[ ]	[ ]	[ ]	[ ]
4. Added new soil to any new holes and raked the beds lightly.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.28





FILLING HOLES OR DEPRESSIONS IN LAWNS

Objective No. 50

Ornamental Horticulture

INTRODUCTION

Sometimes lawns display slight holes or depressions. These are easily identified after heavy rainfall; there will be puddles of water in the depressions. Such holes or depressions may be detrimental in several ways--water over the grass for long periods might kill the grass; the holes might cause uneven mowing or even scalping; the holes or depressions could be unsightly. In this learning activity package, you will learn how to fill in holes or depressions in the lawn so that a more attractive lawn is maintained.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVES

Given the necessary tools and topsoil, fill all holes and depressions in a lawn. The topsoil applied to each depression must match the contour of the area when packed.

LEARNING ACTIVITIES

1 READ "Renovating Old Turf Areas" on page 144 of *Turfgrass Maintenance and Establishment – A Student Handbook.*

or

2 READ "Renovating the Lawn" on pp. 121-123 of *Approved Practices in Beautifying the Home Grounds.*

or

3 READ "Lawn Renovation" on p. 68 of *Landscaping the Home and School Grounds.*

or _____

4 READ instructions.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Filling in Holes or Depressions in Lawn."

6 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Not applicable

TOOLS AND EQUIPMENT NEEDED

1. Wheelbarrow
2. Shovel
3. Iron rake
4. Lawn roller
5. Soil screen

MATERIALS AND SUPPLIES NEEDED

1. Top soil
2. Stakes

INSTRUCTIONS

FILLING HOLES OR DEPRESSIONS IN LAWNS

(1) Load wheelbarrow with topsoil.

(2) Locate holes or depressions in lawn.

(3) Mark all holes and depressions.

(4) Fill each hole with topsoil, and compact slightly to prevent washing and settling.

(5) Rake topsoil to contour of areas.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS PAGE

Answer the following:

1. The topsoil used for filling holes or depressions in lawns should be well screened.

   True_____ False_____

2. Topsoil put in the holes or depressions should be left higher than the lawn area so that it will be level after settling.

   True_____ False_____

3. The best time of year to do any renovating is

   a. winter
   b. early spring
   c. late spring or early summer
   d. late summer or early fall

4. Raking is done to loosen the topsoil so that the surrounding lawn grass can easily grow into the newly added topsoil.

   True_____ False_____

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

A lawn area will be identified by your instructor. Fill all holes and depressions in the lawn with topsoil.

CORRECT RESPONSES

1. True 2. False 3. d. 4. False

DO NOT WRITE ON THIS SHEET

LAP 28

Student _____

Date _____

FILLING HOLES OR DEPRESSIONS IN LAWNS

Instructor's Final Checklist

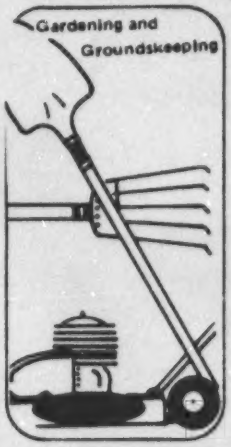
Check the student's performance in the following elements of filling holes or depressions in lawns.

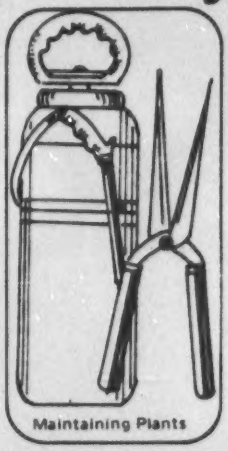
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Screened the topsoil before applying to the depressions.	[ ]	[ ]	[ ]	[ ]
2.	Applied the topsoil to each depression and matched the contour of the area when packed.	[ ]	[ ]	[ ]	[ ]
3.	Packed each area after the topsoil was added.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 29





SODDING WORN SPOTS IN A LAWN

Objective No. 66

Ornamental Horticulture

INTRODUCTION

The quickest way to renovate worn spots in lawns is by sodding. There is no waiting period to get a complete cover of grass, sodding gives complete coverage immediately. Sodding is the most expensive method of establishing lawn grass, but for renovating worn spots the cost is not a big factor since you are not going to use an extensive quantity of sod. In this learning activity package, you will learn how to sod worn spots in lawns.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given cultivation tools and sod, sod bare or worn spots on an established lawn. Newly sodded areas should resemble a checkerboard design.

LEARNING ACTIVITIES

1 READ "Sodding Critical Areas" on pp. 168-171 of *Turf Management Handbook.*

or

2 READ "Use Sod Where Necessary" on pp. 96-97 of *Approved Practices in Beautifying the Home Grounds.*

or

3 READ "Sodding" on pp. 142-143 of *Turfgrass Maintenance and Establishment – A Student Handbook.*

or_____

4 READ the instructions.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Sodding Worn Spots in Lawns."

6 ARRANGE with your instructor to complete this module by going through the Check-Out Activities.

SAFETY

Not applicable

TOOLS AND EQUIPMENT NEEDED

1. Wheelbarrow
2. Shovel
3. Lawn Roller
4. Sprinkler
5. Water Hose
6. Roto-tiller
7. Iron rake

MATERIALS AND SUPPLIES NEEDED

1. Sod
2. Topsoil
3. A water source

Figure 1. Sod should be laid in a brick or checkerboard pattern. Sod strips should be placed perpendicular to the slope of a hill.

INSTRUCTIONS

SODDING WORN SPOTS IN LAWNS

(1) Till soil to shallow depth and rake smooth.

(2) Carefully unroll sod and place pieces in staggered, checkerboard pattern.

(3) Join edges of sod firmly.

(4) After all sod has been placed on area, roll or tamp area. Rolling should be perpendicular to direction in which sod lengths were transplanted.

(5) Thoroughly water sod as soon after rolling as possible.

(6) Water sod regularly until rooted.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.
SODDING WORN SPOTS IN LAWNS

Answer the following:

1. Soil preparation for sodding is the same as soil preparation for seeding.

   True_____False _____

2. The best season for sodding is

   a. fall
   b. winter
   c. spring
   d. summer, even though it can be done in other seasons

3. The seedbed for sod should be rolled ___ laying the sod.

   a. before
   b. after
   c. before and after

4. One advantage of sodding is that the sod does not need to be good quality grass.

   True_____False _____

5. Sod should be allowed to dry before placing it on the seedbed.

   True _____False _____

6. After laying the sod, the turf should be immediately

   a. fertilized
   b. raked
   c. watered
   d. mowed

CORRECT RESPONSES

1. True 2. (c) 3. (c) 4. False 5. False 6. (c)

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Sod bare or worn spots on an established lawn.

DO NOT WRITE ON THIS SHEET

LAP 29

Student _____

Date _____

SODDING WORN SPOTS IN LAWNS

Instructor's Final Checklist

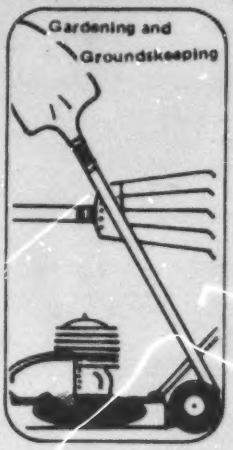
Check the student's performance in the following elements of sodding worn spots in lawns.

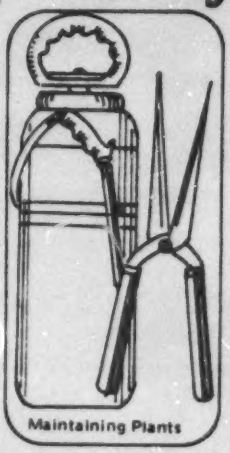
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Tilled, raked, and rolled the seedbed before laying the sod.	[ ]	[ ]	[ ]	[ ]
2. Layed the sod tightly together and with staggered joints.	[ ]	[ ]	[ ]	[ ]
3. Rolled sod perpendicular to the direction the sod lengths were laid.	[ ]	[ ]	[ ]	[ ]
4. Watered the sod immediately after it was laid.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 30





TRANSPLANTING TREES

Objective No. 72

Ornamental Horticulture

INTRODUCTION

Setting plants is one task that every horticultural worker must be able to master. Transplanting trees from one location to another or from containers is very common in doing groundskeeping work. Small trees are usually transplanted barerooted and large trees are usually balled and burlapped. In this learning activity package you will learn how to transplant trees.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVES

Given a small bareroot tree and access to planting tools and equipment, transplant the tree in a manner that roots will not be damaged or restricted from their natural lie. When settled, the filled hole should be level with the contour of the surrounding soil.

LEARNING ACTIVITIES

1 READ "Planting Ornamentals" on pp. 47-53 of *Landscape Maintenance and Establishment – A Student Handbook.*

or

2 READ "Setting Plants" on pp. 170-173 of *Approved Practices in Beautifying the Home Grounds.*

or

3 READ "Shrub Establishment" on pp. 46-49 of *Landscaping the Home and School Grounds.*

or

4 READ "Prune Newly Set Plants" on p. 173 of *Approved Practices in Beautifying the Home Grounds.*

or_____

5 READ the instructions.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Transplanting Trees".

7 ARRANGE with your instructor to complete this module by going through the Check-Out Activities.

SAFETY

Be careful if you need to use the knife. Remember! Even dull knives can cut people.

TOOLS AND EQUIPMENT NEEDED

1. Wheelbarrow
2. Shovel
3. Lopper
4. Hand pruner
5. Water hose or water can
6. Sharp knife

MATERIALS AND SUPPLIES NEEDED

1. Fertilizer or good topsoil
2. Water source
3. Stakes

INSTRUCTIONS

TRANSPLANTING TREES

(1) Remove plant from container.

(2) Check for damaged roots. Remove broken roots.

(3) Dig hole 6" deeper and 6" wider than plant's root system. (15cm)

(4) Place plant in hole to same depth as previously grown.

(5) Spread roots into natural growing position.

(6) Fill soil around roots and in hole.

(7) Tamp soil until firm.

(8) Water plant.

(9) After water has settled, fill hole with soil to level of surrounding soil surface.

(10) Wrap trunk of tree to protect from weather, if appropriate.

(11) Stake tree to protect from wind damage.

(12) Prune tree, if necessary.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET
TRANSPLANTING TREES

Answer the following:

1. For setting bareroot trees, the hole should be 12" deeper and 12" wider than the plant's root system. (30 cm)

   True_____ False_____

2. For setting balled and burlapped plants, the hole should be twice as wide as the root ball.

   True_____ False_____

3. The holes should be completely filled with soil before adding water.

   True_____ False_____

4. Balled and burlapped plants should have the burlap removed before planting.

   True_____ False_____

5. Damaged roots should be pruned from bareroot plants.

   True_____ False_____

6. Bareroot plants should be pruned about 1/3 – 1/2 since a large portion of the roots were lost.

   True_____ False_____

CORRECT RESPONSES

1. False 2. True 3. False 4. False
5. True 6. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Transplant a bareroot tree. Your instructor will provide the necessary tools and materials.

DO NOT WRITE ON THIS SHEET

LAP 30

Student _____

Date _____

TRANSPLANTING TREES

Instructor's Final Checklist

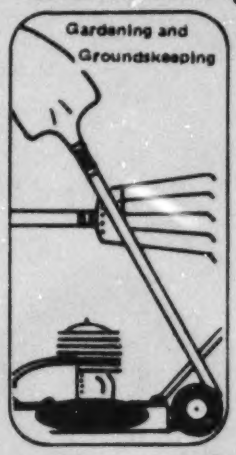
Check the student's performance in the following elements of transplanting trees.

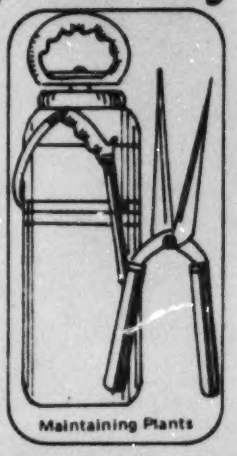
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Dug the hole to correct size to accommodate the provided plant.	[ ]	[ ]	[ ]	[ ]
2.	Tamped the soil some before filling the entire hole.	[ ]	[ ]	[ ]	[ ]
3.	Spread the roots into a natural growing position.	[ ]	[ ]	[ ]	[ ]
4.	Placed the tree in the hole to same depth as previously grown.	[ ]	[ ]	[ ]	[ ]
5.	Pruned the tree as required.	[ ]	[ ]	[ ]	[ ]
6.	Watered the tree thoroughly after being transplanted.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 31





BRACING NEWLY-PLANTED TREES

Objective No. 68 & 69

Ornamental Horticulture

INTRODUCTION

No matter how well trees are tamped at setting, there will be movement caused by wind. Roots will not properly anchor the tree until they have had a chance to anchor themselves into the soil. For this reason, it is necessary to brace trees at planting. In this learning activity package, you will learn how to brace newly-planted trees.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a wooden stake, sledge hammer and tying materials, brace a newly-planted tree which is 2" (5 cm) or less in diameter. The stake should not damage bark and must prevent leaning when 10-20 pounds of force is applied halfway up the tree trunk.

LEARNING ACTIVITIES

1 READ "Wrapping and Staking Trees" on pp. 49-53 of *Landscape Maintenance and Establishment – A Student Handbook.*

or

2 OBSERVE figures 12, 13, and 14 on pp. 51-53 of *Landscape Maintenance and Establishment – A Student handbook.*

or

3 READ "Brace Newly-Planted Trees" on p. 176 of *Approved Practices in Beautifying the Home Grounds.*

or

4 STUDY figure 6-11 on p. 178 of *Approved Practices in Beautifying the Home Grounds.*

or

5 READ *Landscape* [illegible]*tenance,* Vocational Education Produ[illegible]ions, pp. 28-30.

or _____

6 READ the instructions

7 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Bracing Newly-planted Trees".

8 ARRANGE with your instructor to complete this module by going through the Check-Out Activities.

SAFETY

Be careful if you need to use the knife.

TOOLS AND EQUIPMENT NEEDED

1. Sledge hammer
2. Knife

MATERIALS AND SUPPLIES NEEDED

1. Wooden Stake(s)
2. Old pieces of hose
3. Wire or some type of tying material

INSTRUCTIONS

BRACING NEWLY-PLANTED TREES

(1) Determine the length of stake.

(2) Cut stake to length.

(3) Drive stake 2' (.61 m) into ground 6" (15 cm) from tree trunk on windward side of tree. After stake has been driven into ground, its top should be about midpoint of tree trunk.

(4) Tie tree to stake in three places with leather, rope, or other material which will not cut bark of tree. Trunk should stand straight and may be wrapped, then tied with wire.

2. The top of the stake(s) after driven into the ground should be midway between the bottom branch and the top of the tree.

   True _____ False _____

3. The best way to protect the tree trunk from the support wire is to wrap the entire trunk.

   True _____ False _____

4. Trees more than 4" (10 cm) in diameter need to be braced with guy wires instead of stakes.

   True _____ False _____

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

A tree 2" (5 cm) or less in diameter has recently been planted. Brace the tree.

STUDENT SELF-CHECK
DO NOT WRITE ON THIS SHEET
BRACING NEWLY-PLANTED TREES

Answer the following:

1. For staking a tree 2" (5 cm) or less in diameter, use 2 stakes.

   True _____ False _____

CORRECT RESPONSES

1. False 2. True 3. False 4. True

DO NOT WRITE ON THIS SHEET

LAP 31

Student _____

Date _____

BRACING NEWLY-PLANTED TREES

Instructor's Final Checklist

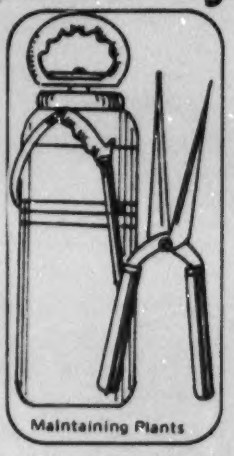
Check the student's performance in the following elements of bracing newly-planted trees.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Placed the stake about 2' in ground and about 6" – 1' from the tree trunk. (2' = .61m; 6" = 15.24 cm)	[ ]	[ ]	[ ]	[ ]
2. Placed the top of the stake about the mid-point of the tree trunk.	[ ]	[ ]	[ ]	[ ]
3. Protected the tree trunk adequately from the tying material by using old water hose lengths.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.32



PRUNING AND TRIMMING TREES

Objective No. 59

Ornamental Horticulture

INTRODUCTION

Trees must be pruned so that they may maintain their desired shape and beauty. If trees were spaced correctly at planting, top growth should seldom have to be removed. Most pruning on trees will involve lateral branches. In this learning activity package, you will learn how to prune and trim trees.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

A tree with branches greater than 1 1/2" (3.81 cm) in diameter has much unwanted growth. Prune the tree, using a pruning saw, power saw, pole saw, heavy duty pruning knife, and climbing equipment. Cuts should be clean and flush to the leader with no splits evident.

LEARNING ACTIVITIES

1 READ "Pruning Shade Trees" on pp. 15-16 of *Landscape Maintenance and Establishment - A Student Handbook.*

or _____

2 OBSERVE figure 3 on p. 17 of *Landscape Maintenance and Establishment - A Student Handbook.*

or _____

3 READ "Prune Trees Only as Needed" on pp. 189-191 of *Approved Practices in Beautifying the Home Grounds.*

or

4 READ *Landscape Maintenance,* Vocational Education Productions, pp. 25-26.

or

5 STUDY figures 7-5 and 7-6 on p. 190 of *Approved Practices in Beautifying the Home Grounds.*

or _____

6 READ the Instructions, PRUNING AND TRIMMING TREES.

7 CHECK YOUR KNOWLEDGE of pruning and trimming trees by taking the Student Self-Check.

8 ARRANGE with your instructor to complete this module by going through the Check-Out Activity.

SAFETY

1 If any climbing is necessary, be extremely cautious using the gafs and safety belt.

2 Be extremely cautious not to cut a branch against or onto you while in the tree.

3 Check for electrical wires before felling any branches.

4 Show all due respect while using the power saw.

EQUIPMENT NEEDED

1 Pruning saw
2 Pole saw
3 Power saw
4 Pruning knife
5 Tree gafs and safety belt

MATERIALS NEEDED

1 Rope
2 Pruning paint

INSTRUCTIONS

PRUNING AND TRIMMING TREES

(1) Inspect tools and/or equipment to determine if they are in working condition.

(2) Select correct tool for each particular cut.

(3) Remove all dead, diseased, or injured wood.

(4) Remove wayward branches.

(5) Lower or raise crown of tree, using pruning techniques.

(6) Shape tree.

(7) Thin crown.

(8) Seal all large cuts with antiseptic compound.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

PRUNING AND TRIMMING TREES

Answer the following:

1. To remove large limbs from trees, you should make

   (a) one cut
   (b) two cuts
   (c) three cuts
   (d) four cuts

2. Any wound larger than _____ should be treated with pruning paint.

   (a) 1/2" (1.27 cm)
   (b) 1" (2.54 cm)
   (c) 1 1/2" (3.81 cm)
   (d) 2" (5.08 cm)

3. Deciduous shade trees should be pruned in

   (a) the summer
   (b) the fall
   (c) late fall or early winter
   (d) late winter or early spring

4. All branches should be removed flush with the trunk or branch on which it was growing.

   True ___ False ___

5. If trees are carefully selected and properly located at planting, it is not necessary to do a lot of pruning.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CORRECT RESPONSES

1. (c) 2. (b) 3. (d) 4. True 5. True

CHECK-OUT ACTIVITY

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, PRUNING AND TRIMMING TREES.

Prune a tree with branches greater than 1½" (3.81 cm) in diameter.

DO NOT WRITE ON THIS SHEET

LAP 32

Student _____

Date _____

PRUNING AND TRIMMING TREES

Instructor's Final Checklist

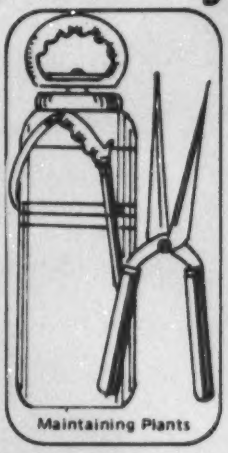
Check the student's performance in the following elements of pruning and trimming trees.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Selected the correct tool for each cut.	[ ]	[ ]	[ ]	[ ]
2. Cut three cuts to remove branches 1 1/2" (3.81 cm) or larger in diameter.	[ ]	[ ]	[ ]	[ ]
3. Removed all undesirable growth such as water sprouts, suckers, and secondary leaders.	[ ]	[ ]	[ ]	[ ]
4. Applied pruning paint to all cuts, 1" (2.54 cm) or larger in diameter.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 33



PRUNING AND TRIMMING SHRUBS

Objective No. 60

Ornamental Horticulture

INTRODUCTION

Shrubs must be pruned and trimmed so that they will maintain beauty. Shabby growth on shrubs takes away the beauty of the landscape. Pruning is done with a specific objective in mind. Horticultural workers must know what objective they are pursuing before trimming shrubs randomly. In this learning activity package, you will learn how to prune and trim shrubs.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

An ornamental shrub with branches ¾" to 1½" (1.91 to 3.81 cm) in diameter has been unattended for one year. Prune the shrub to provide stimulation and rejuvenation. Use a pruning saw, lopping shears, and heavy primary knife to complete the task. Cuts must be made 1/4" (.64 cm) above a bud, small side branch, or main branches. Remaining growth should be well balanced with available sunlight spaces.

LEARNING ACTIVITIES

1 READ "Pruning Shrubs" on p. 51 of *Landscaping the Home and School Grounds.*

or

2 READ "Pruning" on pp. 12-14 of *Landscape Maintenance and Establishment - A Student Handbook.*

or

3 READ "Pruning Ornamental Evergreen Plants" on pp. 196-199 of *Approved Practices in Beautifying the Home Grounds.*

or

4 READ "Pruning" on pp. 25-27 of *Landscape Maintenance.*

or _____

5 OBSERVE part C of figure 7-6 on p. 190 of *Approved Practices in Beautifying the Home Grounds.*

or _____

6 READ the Instructions, PRUNING AND TRIMMING SHRUBS.

7 CHECK YOUR KNOWLEDGE of pruning and trimming shrubs by taking the Student Self-Check.

8 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Be careful when using the pruning knife; follow correct techniques of cutting – cut away from you!

EQUIPMENT NEEDED

1 Pruning saw
2 Lopper
3 Pruning knife

MATERIALS NEEDED

1 Pruning paint

INSTRUCTIONS

PRUNING AND TRIMMING SHRUBS

(1) Inspect tools to determine condition and sharpness.

(2) Remove all diseased growth on shrubs.

(3) Remove suckers.

(4) Remove broken and dead branches.

(5) Remove duplicate branches.

(6) Remove asymmetrical growth.

(7) Seal large cuts with antiseptic compound.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

PRUNING AND TRIMMING SHRUBS

Answer the following:

1. Shrubs are generally pruned during the dormant season.

   True ___ False ___

2. Cuts should be made at least _____ above a bud or lateral branch or else the bud or lateral will die.

   (a) 1" (2.54 cm)
   (b) 1/2" (1.27 cm)
   (c) 1/4" (.64 cm)
   (d) 2" (5.08 cm)

3. Spring flowering shrubs should be pruned in late winter.

   True ___ False ___

4. Probably the first pruning should remove injured, diseased or dead branches.

   True ___ False ___

5. One of the purposes of pruning is to keep the root system and branch system in balance.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CORRECT RESPONSES

1. True 2. (c) 3. False 4. True 5. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, PRUNING AND TRIMMING SHRUBS.

Given an ornamental shrub with branches 3/4 to 1 1/2 inches (1.91 to 3.81 cm) in diameter, prune the shrub for purposes of stimulation and rejuvenation.

DO NOT WRITE ON THIS SHEET

LAP 33

Student _____

Date _____

PRUNING AND TRIMMING SHRUBS

Instructor's Final Checklist

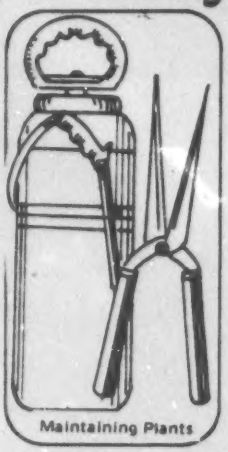
Check the student's performance in the following elements of pruning and trimming shrubs.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Made the pruning cuts 1/4" (.64 cm) above buds and lateral branches.	[ ]	[ ]	[ ]	[ ]
2. Completed shrub had symmetrical growth branches after pruning.	[ ]	[ ]	[ ]	[ ]
3. Sealed large cuts with pruning paint.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.34



PRUNING SHRUBS

Objective No. 61

Ornamental Horticulture

INTRODUCTION

Pruning is simply removing part of a plant to give it new appearance. The desired new appearance may not be apparent immediately after the pruning process because the plant may need time to grow into the new appearance. When shrubs are unattended for at least a year (one growth cycle), they need to be pruned to rejuvenate their growth so that they will take on the desired appearance. In this learning activity package, you will learn how to prune shrubs.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given an ornamental shrub with branches 3/4" (1.9 cm) or less in diameter unattended for one year, prune the shrub to provide stimulation and rejuvenation. Use a hand pruning shear and a pruning saw to complete the task. Cuts must be made 1/4" (.6 cm) above a bud, small side branch, or main branch. Remaining growth should be well balanced.

LEARNING ACTIVITIES

1 READ "Pruning" on pp. 91–94 of *Nursery Production and Landscape Maintenance.*

or

2 READ "Pruning" on pp. 25–27 of *Landscape Maintenance.*

or

3 READ "Pruning Shrubs" on p. 51 of *Landscaping the Home and School Grounds.*

or _____

4 OBSERVE as your instructor demonstrates pruning methods for rejuvenation.

5 READ the instructions.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Pruning Shrubs."

7 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Exercise caution when using shears or a pruning saw.

TOOLS AND EQUIPMENT NEEDED

1 hand pruning shear
2 pruning saw

MATERIALS AND SUPPLIES NEEDED

N/A

INSTRUCTIONS

(1) Inspect tools and determine if they are in proper working condition and are sharp.

(2) Remove all insect-infested or diseased branches.

(3) Remove suckers.

(4) Remove broken and dead branches.

(5) Remove duplicate branches.

(6) Remove asymmetrical growth.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

PRUNING SHRUBS

1. Shrubs are generally pruned about one week after their active growth starts.

   True ___ False ___

2. Pruning cuts should be made about 1/4" above a bud. (.6 cm)

   True ___ False ___

3. Suckers should not be removed because they provide a source of rapid growth.

   True ___ False ___

4. Diseased branches should not be pruned so that the disease can be treated with a chemical pesticide while the disease is growing actively on the shrub.

   True ___ False ___

5. To rejuvenate a weak plant, prune it heavily.

   True ___ False ___

6. If a plant grows rapidly and vigorously, it should not be pruned severely.

   True ___ False ___

CORRECT RESPONSES

1. False 2. True 3. False 4. False 5. True 6. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Prune an ornamental shrub with branches 3/4" (1.9 cm) or less in diameter for purposes of stimulation and rejuvenation.

DO NOT WRITE ON THIS SHEET

LAP 34

Student _____

Date _____

PRUNING SHRUBS

Instructor's Final Checklist

Check the student's performance in the following elements of Pruning Shrubs.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Removed insect-infested and diseased branches.	[ ]	[ ]	[ ]	[ ]
2.	Removed suckers.	[ ]	[ ]	[ ]	[ ]
3.	Removed broken and dead branches.	[ ]	[ ]	[ ]	[ ]
4.	Made cuts 1/4" (.6 cm) above buds.	[ ]	[ ]	[ ]	[ ]
5.	Pruned branches were disposed of properly	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 35

PRUNING HEDGES

Objective No. 63

Ornamental Horticulture

INTRODUCTION

Hedges are pruned to a more formal shape, therefore they need special attention. Pruning hedges does not just give the hedges shape; it causes the plants to thicken and have compact growth. Different hedges might be shaped differently, but the pruning principles are the same. In this learning activity package you will learn how to prune hedges.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a row of established hedge plants in need of shaping, prune the hedges to desired size using electric and hand hedge shears. The hedge should be shaped to permit light to stimulate growth on all areas of the hedge.

LEARNING ACTIVITIES

1 READ "Prune the Hedges" on pp. 194-195 of *Approved Practices in Beautifying the Home Grounds.*

or

2 READ "Maintaining Formal Hedges" on pp. 14-15 of *Landscape Maintenance and Establishment - A Student Handbook.*

or

3 READ "Hedges" on pp. 321-322 of *Fundamentals of Horticulture*, 1975 ed.

or _____

4 OBSERVE figure 14-13 on p. 322 of *Fundamentals of Horticulture*, 1975 ed.

or _____

5 READ the Instructions, PRUNING HEDGES.

6 CHECK YOUR KNOWLEDGE of pruning hedges by taking the Student Self-Check.

7 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

SAFETY

Be careful not to clip the electrical cord with the hedge shears.

EQUIPMENT NEEDED

1 Electric hedge shears
2 Hedge shears

MATERIALS NEEDED

1 Electrical drop cord

INSTRUCTIONS

PRUNING HEDGES

(1) Check tools and equipment for proper condition and sharpness.

(2) Determine desired size and shape of hedge plants. Hedge should be cut slightly undersize.

(3) Remove all growth to accomplish purposes of pruning.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

PRUNING HEDGES

Answer the following:

1. It is not a good practice to prune hedges in late summer because new growth may be killed by hard cold weather.

   True ___ False ___

2. Pruning hedges usually involves

   (a) espaliering
   (b) heading back
   (c) thinning
   (d) cutting back

3. Hedges must be trimmed so that they are the same width at the top as at the bottom.

   True ___ False ___

4. Hedges should never be pruned more than two times a year.

   True ___ False ___

5. It is important that hedges get more sun at the top than at the bottom.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, PRUNING HEDGES.

Prune a hedge to shape using the tools and materials provided by your instructor.

CORRECT RESPONSES

1. True 2. (b) 3. False 4. False 5. False

DO NOT WRITE ON THIS SHEET

LAP 35

Student _____

Date _____

PRUNING HEDGES

Instructor's Final Checklist

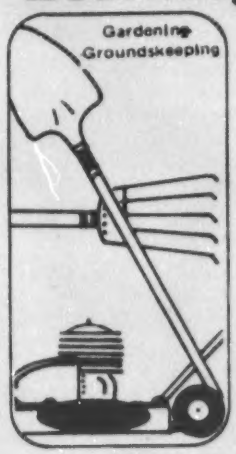
Check the student's performance in the following elements of pruning hedges.

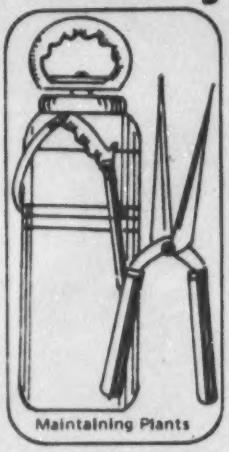
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Trimmed the hedge uniformly for shape.	[ ]	[ ]	[ ]	[ ]
2. Left the bottom of the hedge wider than the top.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 36





APPLYING TREE PAINT TO TREE WOUNDS

Objective No. 45

Ornamental Horticulture

INTRODUCTION

Wounds produced by pruning should be treated with tree paint or pruning paint to seal the exposed wood. This prevents rotting and also prevents insects and diseases from entering the cut. The paint will sometimes entice healing. Authorities seem to differ on what size cut should be treated. The extremely small cuts (less than 1/2" diameter) (1.27 cm) will readily heal themselves. Any cut larger than 1/2" - 1" (1.27 - 2.54 cm) should be treated with tree paint. In this learning activity package, you will learn how to apply tree paint to tree wounds.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity,

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given freshly pruned limbs 1" (2.54 cm) or greater in diameter and a pruning knife, apply a coat of antiseptic tree paint to all exposed pruned areas. Periodic observations of the treated areas should reveal that the tree wound is not decaying.

LEARNING ACTIVITIES

1 READ "Treatment of Pruning Wounds" on pp. 322-323 of *Fundamentals of Horticulture.*

or

2 READ the second paragraph at top left of p. 55 in *Landscaping the Home and School Grounds.*

or

3 READ the first paragraph at the top of p. 16 in *Landscape Maintenance and Establishment - A Student Handbook.*

or

4 READ *Landscape Maintenance,* Vocational Education Productions, pp. 23-24.

or_____

5 READ the Instructions, APPLYING TREE PAINT TO TREE WOUNDS.

6 CHECK YOUR KNOWLEDGE of applying tree paint to tree wounds by taking the Student Self-Check.

7 ARRANGE with your instructor to complete this package by going through the Check-Out Activities.

EQUIPMENT NEEDED

1 Pruning knife

MATERIALS NEEDED

1 Pruning paint (tree paint)

SAFETY

Take care when using the pruning knife.

INSTRUCTIONS

APPLYING TREE PAINT TO TREE WOUNDS

(1) Clean and smooth cut area, using a pruning knife.

(2) Apply tree paint, filling pores and covering all exposed areas.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET.

APPLYING TREE PAINT TO TREE WOUNDS

Answer the following.

1. Every tree wound must be painted to entice healing.

   True ___ False ___

2. Some tree paints might retard the healing process.

   True ___ False ___

3. It is imperative that every wound 1" (2.54 cm) or greater in diameter be treated with paint.

   True ___ False ___

4. The wound does not necessarily need to be cleaned before applying the paint.

   True ___ False ___

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist, APPLYING TREE PAINT TO TREE WOUNDS.

Apply a coat of antiseptic tree paint to areas exposed by pruning.

CORRECT RESPONSES

1. False 2. True 3. True 4. False

DO NOT WRITE ON THIS SHEET

LAP 36

Student _____

Date _____

APPLYING TREE PAINT TO TREE WOUNDS

Instructor's Final Checklist

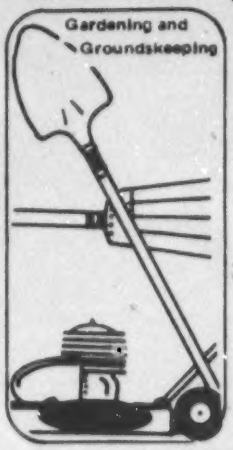
Check the student's performance in the following elements of applying tree paint to tree wounds.

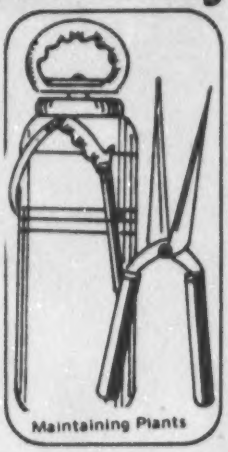
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Cleaned and smoothed the wounds before applying the paint.	[ ]	[ ]	[ ]	[ ]
2. Covered all exposed areas of the wounds with paint.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 37





TRAINING PLANTS AND SHRUBS

Objective No. 70 & 71

Ornamental Horticulture

INTRODUCTION

Sometimes it is suitable to train plants to a wall or arbor in the landscape. These designs give interesting effects to the landscape as well as help overcome large bare walls or openings in the landscape. Training plants or shrubs to espalier or pleach requires extra attention from the groundskeeper. In this learning activity package, you will learn how to train plants and shrubs.

DIRECTIONS

Read the objectives below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVES

Given a plant that trains easily, necessary equipment, and aids for espaliers, train the plant for a specified purpose or shape. All growth on one side should be eliminated. Copper wire layout should match predetermined purpose or shape.

Given a plant that lends itself to the desired design, an arbor, necessary pruning equipment, and materials for support, prune and interweave the plant growth to accomplish the predetermined design and shape established by the instructor. All excess must be removed with remaining plant shoots interwoven in a stationary position.

LEARNING ACTIVITIES

1 READ "Use Espaliered Shrubs in Place of Vines" on p. 141 of *Approved Practices in Beautifying the Home Grounds.*

or

2 READ "Prune for Espalier on p. 194 of *Approved Practices in Beautifying the Home Grounds.*

or

3 READ "Use Arbors to Accent Areas" on p. 227 of *Approved Practices in Beautifying the Home Grounds.*

or _____

4 OBSERVE as your instructor demonstrates how to espalier and pleach plants and shrubs.

5 READ the instructions.

6 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Training Plants and Shrubs."

7 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

N/A

TOOLS AND EQUIPMENT NEEDED

1. Lopper
2. Pruning saw
3. Hand pruner
4. Hammer
5. Hand saw
6. Post hole digger

MATERIALS AND SUPPLIES NEEDED

1. Nails
2. Masonry nails
3. Lumber (if needed for arbor)
4. Wire ties

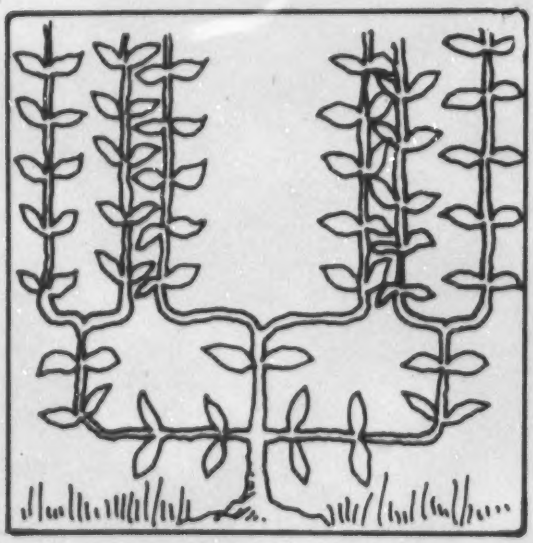


Figure 1. An example of an espaliered plant.

INSTRUCTIONS

TRAINING PLANTS AND SHRUBS

(1) Determine ultimate size and form of plant.

(2) Construct frame of desired design, or lay out design on background of structure.

(3) Prune unneeded foliage from plant.

(4) For espalierings, place flat side against wall. Any side branches which may be bent to follow design should be retained. Tie all branches to wire along design previously laid out.

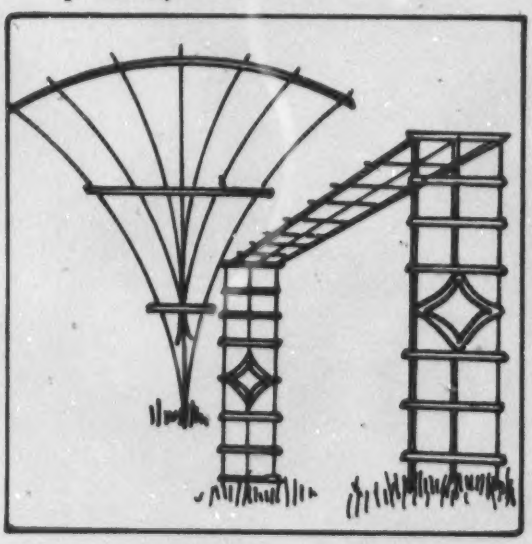


Figure 2. Two types of trellises.

(5) For pleaching, prune trunk of plant so that trunk is straight and plants are an equal distance apart. Prune most of front and back branches. Prune top and lower branches to form level planes. Interweave side branches with adjacent tree branches. Continue interweaving side branches with adjacent tree branches as the growth process continues.

STUDENT SELF-CHECK
DO NOT WRITE ON THIS SHEET
TRAINING PLANTS AND SHRUBS

Answer the following:

1. Training a plant to grow to a wall is called espaliering. True False

2. Red tip photinia is an ideal shrub to use for espaliering. True False

3. Do not remove excess growth from shrubs that are pleached because this excess growth gives the arbor a full appearance. True False

4. Pyracantha is very easily trained to espalier. True False

5. It is best not to determine desired shape before training plant to the structure because how easily the plant can be fastened to the structure will determine its desired shape. True False

CHECK-OUT ACTIVITIES

The statement below explains the activities you must be able to complete in order to finish this learning activity package. As you go through each activity, your instructor will rate your performance using the Instructor's Final Checklist.

Train a plant to the shape recommended by your instructor.

CORRECT RESPONSES

1. True 2. False 3. False 4. True
5. False

DO NOT WRITE ON THIS SHEET

LAP 37

Student _____

Date _____

TRAINING PLANTS AND SHRUBS

Instructor's Final Checklist

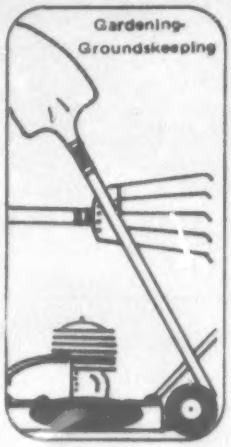
Check the student's performance in the following elements of training plants and shrubs.

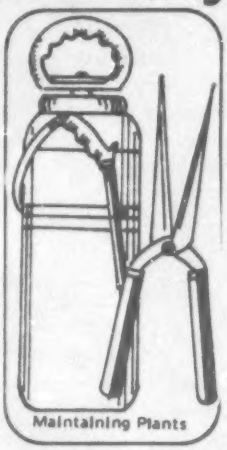
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Pruned the plant properly for the training process.	[ ]	[ ]	[ ]	[ ]
2. Determined the ultimate size and/or shape initially.	[ ]	[ ]	[ ]	[ ]
3. Removed excess growth after the plant was fastened to the training structure.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.38





BRACING OVERLOADED LIMBS OR BRANCHES

Objective No. 46

Ornamental Horticulture

INTRODUCTION

When trees develop narrow crotches, they are more apt to be damaged due to splitting at these crotches. The groundskeeper should be knowledgeable in bracing these overloaded branches. Sometimes splitting can be prevented simply by pruning, but usually bracing is required. In this learning activity package, you will learn how to brace overloaded limbs on branches.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given pliers, cable, brace and bit, eyebolts, and wrench, brace V-crotch limbs on a tree. The cable must not damage the tree bark during windy periods. No splitting of the crotch must occur during periods of branch overloads.

LEARNING ACTIVITIES

1 READ "Brace Trees to Prevent Limb Breakage" on pp. 216-217 of *Approved Practices in Beautifying the Home Grounds.*

or _____

2 STUDY the drawings "Guying Larger Trees" on p. 29 of *Landscape Maintenance.*

or _____

3 OBSERVE as your instructor demonstrates how to brace an overloaded branch.

4 READ the Instructions.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Bracing Overloaded Limbs or Branches."

6 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Be careful if you need to do any climbing in the tree; if a ladder is used, follow good safety practices.

TOOLS AND EQUIPMENT NEEDED

1. Pliers
2. Brace and bit
3. Wrench (adjustable)
4. Pruning saw

MATERIALS NEEDED

1. Eyebolts
2. Cable
3. Sealing compound

INSTRUCTIONS

BRACING OVERLOADED LIMBS OR BRANCHES

(1) Determine best location of brace.

(2) Drill holes in limbs for eyebolts.

(3) Fasten eyebolt through each limb parallel to direction of cable pull.

(4) Fasten a steel cable to each eyebolt and tighten until snug.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS SHEET

BRACING OVERLOADED LIMBS OR BRANCHES

1. It is a good practice to thin the tree if splitting occurs even though the branches are braced. True False

2. Washers used around the threaded rods prevent moisture, insects, and diseases from entering the holes. True False

3. The bark should be protected from damage if any cables are in position to rub against it. True False

4. Some trees naturally develop weak crotches due to the growth characteristics of the trees. True False

5. Any excess length on the threaded rods should be left to allow for expansion on the trunk at the crotches. True False

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Shown a tree which has a major V-crotch at the first two limbs, brace the limbs, using the cable method.

CORRECT RESPONSES

1. True 2. False 3. True 4. True 5. False

DO NOT WRITE ON THIS SHEET

LAP 38

Student _____

Date _____

BRACING OVERLOADED LIMBS OR BRANCHES

Instructor's Final Checklist

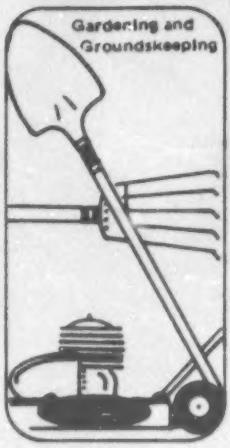
Check the student's performance in the following elements of bracing overloaded limbs or branches.

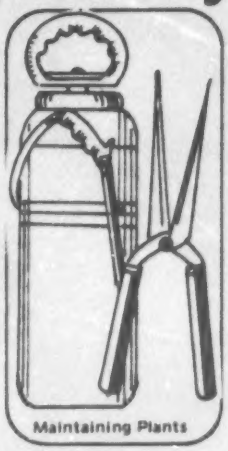
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Positioned the cables to prevent damage to the tree bark during windy periods.	[ ]	[ ]	[ ]	[ ]
2. Fastened eyebolts to each limb parallel to the direction of the cable pull.	[ ]	[ ]	[ ]	[ ]
3. Snugged each cable to desired tightness.	[ ]	[ ]	[ ]	[ ]
4. Sealed wounds and/or openings with the provided compound.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.39





WRAPPING TREES OR SHRUBS TO PROTECT FROM WEATHER

Objective No. 57

Ornamental Horticulture

INTRODUCTION

Thin barked trees need to be protected from winter winds. This is accomplished by wrapping the trunk with some type of protective material. Groundskeepers should be aware of the procedures used to protect those trees that have the thin bark. In this learning activity package you will learn how to wrap trees or shrubs to protect from weather.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, go through the Learning Activities in the order given.

OBJECTIVE

Given a thin-barked tree and wrapping materials, wrap the materials on the tree to protect it from winter weather. All bark on the trunk area as high as 5 ft. (1.5 m) from the ground, or up to lower limbs should be completely covered.

LEARNING ACTIVITIES

1 READ "Wrapping and Staking Trees" on pp. 87-88 of *Nursery Production and Landscape Maintenance.*

or _____

2 OBSERVE as your instructor demonstrates how to correctly wrap a tree for winter protection.

3 READ "Wrapping and Staking Trees," pp. 49-53 of *Landscape Maintenance and Establishment,* 1968 ed.

4 READ the instructions.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Wrapping Trees or Shrubs to Protect from Weather".

6 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities listed.

SAFETY

Follow good cutting procedures when using the knife to cut the wrapping material and string.

TOOLS AND EQUIPMENT NEEDED

Knife

MATERIALS AND SUPPLIES NEEDED

Wrapping Material (burlap or crepe paper)
String

INSTRUCTIONS

WRAPPING TREES OR SHRUBS TO PROTECT FROM WEATHER

1. Begin at top of tree trunk and wrap downward in a spiral form. If burlap is used, fold edges under.

2. After wrapping is completed, take string and wrap in opposite direction and tie to hold wrapping in place.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS PAGE!
WRAPPING TREES OR SHRUBS TO PROTECT FROM WEATHER

1. The tree trunk should be wrapped from top to bottom starting about 5 ft. (1.5 m) above ground.

   True_____False_____

2. Drying winds and winter sunshine are harder on some plants than extreme low temperatures.

   True_____False _____

3. String should be wrapped in same direction as the wrapping material so that the wrapping material will be held securely in place.

   True_____False_____

4. If burlap is used as the wrapping material, 1 in. (2.5 cm) gaps should be left between wraps to allow some fresh air to come in contact with the bark.

   True_____False_____

5. The wrapping material should be left on the tree for one full year.

   True_____False_____

6. Burlap is less sightly than the materials like wax or latex that can be brushed on the trees for protection.

   True_____False_____

CORRECT RESPONSES

1. True 2. True 3. False 4. False
5. False 6. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Wrap a thin-barked tree to protect it from winter weather.

DO NOT WRITE ON THIS SHEET

LAP 39

Student _____

Date _____

WRAPPING TREES OR SHRUBS TO PROTECT FROM WEATHER

Instructor's Final Checklist

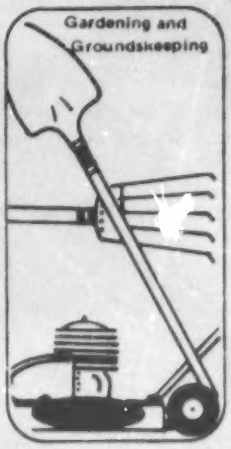
Check the student's performance in the following elements of wrapping trees or shrubs to protect from weather.

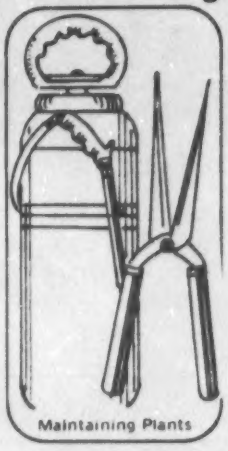
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Wrapped the trunk at least 5 ft. (1.5 m) above ground.	[ ]	[ ]	[ ]	[ ]
2.	Folded edges under if burlap was used as the wrapping material.	[ ]	[ ]	[ ]	[ ]
3.	Wrapped the string in opposite direction of the wrapping material.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.40





TREATING CAVITIES IN TREES

Objective No. 74

Ornamental Horticulture

INTRODUCTION

Cavities in trees need to be treated carefully. Cavities cannot be removed, but corrective measures can be taken to prevent excessive tree damage. In this learning activity package you will learn how to treat cavities in trees.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a hammer, chisel, wound dressing and applicator, treat a tree cavity. The entire area of the cavity must be sealed with the dressing material. Cavity decay must be terminated, as determined by periodic visual inspection for six months.

LEARNING ACTIVITIES

1 READ "Clean Out Cavities" on page 216 of *Approved Practices in Beautifying the Home Grounds.*

2 VIEW figure 7-13 (and read its caption) on page 215 of *Approved Practices in Beautifying the Home Grounds.*

3 READ instructions.

4 OBSERVE closely as your instructor demonstrates how to treat cavities in trees.

5 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Treating Cavities in Trees."

6 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities listed.

SAFETY

Be careful while chiseling; carelessness could lead to your being injured while using this tool.

TOOLS AND EQUIPMENT NEEDED

1. Hammer
2. Chisel (for treating tree cavities)

MATERIALS AND SUPPLIES NEEDED

1. Wound dressing
2. Applicator (for wound dressing)

INSTRUCTIONS

1. Determine extent of cavity.
2. Remove diseased or damaged bark and wood with hammer and chisel.
3. Smooth damaged area with chisel.
4. Apply wound dressing to entire damaged area.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Treat a tree cavity using materials supplied by your instructor.

STUDENT SELF-CHECK

DO NOT WRITE ON THIS PAGE !

TREATING CAVITIES IN TREES

1. Some dead wood should be left in the cavity because this will serve as a protective layer for the live wood.

   True _____ False _____

2. Callused wood should be damaged as little as possible because it contains the tree's conducting tissue.

   True _____ False _____

3. All cavities should be left open to allow exposure to fresh air.

   True _____ False _____

4. Sometimes, cavities might require bracing similar to that done to split crotches.

   True _____ False _____

5. Once the cavity has been thoroughly cleaned, there is no need for further inspection because all the diseased and rotten wood has been destroyed.

   True _____ False _____

CORRECT RESPONSES

1. False 2. True 3. False 4. True
5. False

DO NOT WRITE ON THIS SHEET

LAP 40

Student _____

Date _____

TREATING CAVITIES IN TREES

Instructor's Final Checklist

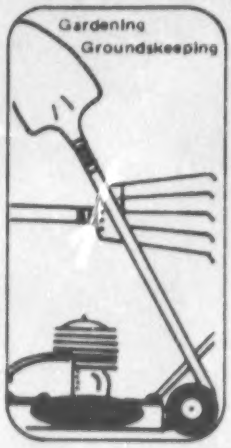
Check the student's performance in the following elements of treating cavities in trees.

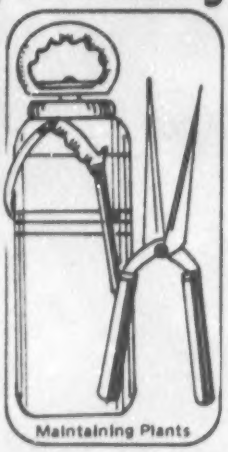
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

		Student Performance			
		Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1.	Removed all dead and water-soaked wood.	[ ]	[ ]	[ ]	[ ]
2.	Shaped the bottom of the cavity to allow water to drain from the cavity.	[ ]	[ ]	[ ]	[ ]
3.	Smoothed the damaged area with the chisel.	[ ]	[ ]	[ ]	[ ]
4.	Applied wound dressing to the entire damaged area.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No. 41





GIRDLING TREES

Objective No. 51

Ornamental Horticulture

INTRODUCTION

Occasionally it is necessary to kill single trees in the landscape so that they can be removed easily. For many years a simple process called girdling has been used to kill those trees that need to be eliminated from the landscape. In this learning activity package, you will learn how to gird trees.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

A tree is to be killed. Using an ax, cut 360°, 2" (5 cm) ring around the tree. All bark and the cambium layers must be removed from the ring.

LEARNING ACTIVITIES

1 READ KILLING UNDESIRABLE TREES.

2 OBSERVE as your instructor demonstrates how to gird a tree.

3 CHECK YOUR KNOWLEDGE by taking the Student Self-Check.

4 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities.

SAFETY

Follow good safety practices when using the ax. Do not allow anyone to stand near while you are girdling.

TOOLS AND EQUIPMENT NEEDED

Ax

MATERIALS AND SUPPLIES NEEDED

N/A

INSTRUCTIONS

KILLING UNDESIRABLE TREES

Girdle Method

A girdle is made by making a double cut completely around the tree. Make a shallow cut, into the sapwood only, and remove the chips. Power saws are desirable for use on larger trees. The use of chemicals is usually necessary on trees under 14 inches (35.56 cm) in diameter to prevent sprouting. Trees 14" (35.56 cm) and larger usually are easy to kill by girdling, because they do not sprout as readily as smaller ones.

Bark girdling that removes a 4-inch (10.16 cm) ring of bark around a tree is also an effective and easy method for girdling trees 10 inches (25.40 cm) in diameter and above. This is done with an axe in the spring of the year, usually April through May, when the bark slips easily.

Frill Method

A frill is made by cutting through the bark with downward strokes encircling the trunk. Make frills as close to the ground as possible as this places the chemical nearer the root system and thus reduces chances for resprouting. Apply solution of 2, 4, 5–T and fuel oil to the point of run-out in frilled area. Use 20 gallons (75.7 l) of fuel oil with each 1 gallon (3.8 l) of 2, 4, 5–T.

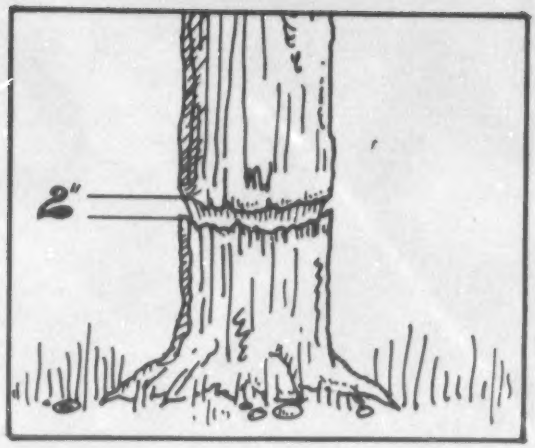


Figure 1. The girdle method is widely used in killing trees above 12 inches (30.48 cm) in diameter. (Clemson Extension Service)

Figure 2. Notches made near the ground reduce sprouting. (Clemson Extension Service)

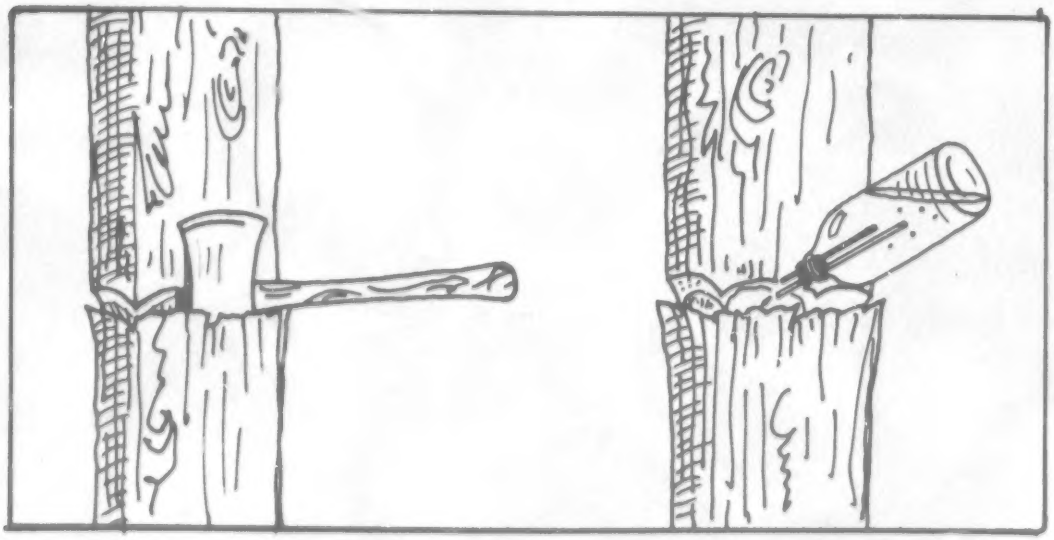


Figure 3. The frill method of applying chemicals is very effective in killing undesirable hardwoods. (Clemson Extension Service)

STUDENT SELF-CHECK
DO NOT WRITE ON THIS SHEET
GIRDLING TREES

1. The ring made when girdling should only cut through the bark. True False

2. Girdling is most effective when combined with the use of herbicides. True False

3. Use of girdling to kill undesirable trees has been limited due to the increased cost of labor. True False

4. The girdled ring should be about 2 in. (5 cm) above ground level. True False

5. To kill the tree by girdling, the cut must sever the cambium layer. True False

6. List at least 2 methods of killing undesirable trees.

7. List at least one chemical commonly used to kill trees.

Compare your answers with the correct responses at the bottom of this page. Review any incorrect answers before going on to the next learning activity.

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

A tree identified by your instructor must be destroyed, gird the tree, using an ax.

CORRECT RESPONSES

1. False
2. True
3. True
4. False
5. True
6. girdling, frill, basal spray, foliage spray
7. 2, 4, 5–T or automate

DO NOT WRITE ON THIS SHEET

LAP 41

Student _____

Date _____

GIRDLING TREES
Instructor's Final Checklist

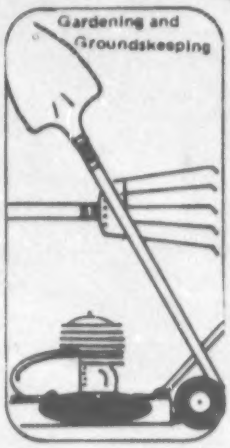
Check the student's performance in the following elements of girdling trees.

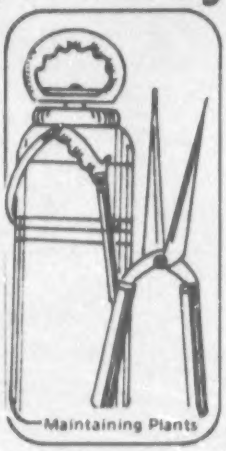
Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Placed girdled ring continuously around the entire tree.	[ ]	[ ]	[ ]	[ ]
2. Removed all bark and the cambium layer from the ring.	[ ]	[ ]	[ ]	[ ]

Learning Activity Package No.42





REMOVING DEAD

OR UNWANTED TREES

Objective No. 64

Ornamental Horticulture

INTRODUCTION

Frequently, the groundskeeping crew is called upon to remove dead or unwanted trees from the landscape. By utilizing proper procedures, the crew may remove the trees without disturbing the surrounding landscape. In this learning activity package, you will learn how to remove dead or unwanted trees.

DIRECTIONS

Read the objective below. If you think you are ready to perform this task, read the Check-Out Activity. Then, arrange with your instructor to complete the Check-Out Activity.

or

If you need further training in order to do the task, complete the Learning Activities in the order given.

OBJECTIVE

Given a tree 6" (15 cm) or less in diameter; remove the tree using a shovel, ax, chains, and jack. The trunk portion must be removed completely from the ground.

LEARNING ACTIVITIES

1 OBSERVE closely as a crew or your instructor demonstrates how to remove a dead or unwanted tree from the landscape.

2 READ the instructions.

3 CHECK YOUR KNOWLEDGE by taking the Student Self-Check "Removing Dead or Unwanted Trees".

4 ARRANGE with your instructor to complete this learning activity package by going through the Check-Out Activities listed.

SAFETY

Follow good safety practices when using the ax. Be extremely careful with the jack and chains!

TOOLS AND EQUIPMENT NEEDED

1. Shovel
2. Ax
3. Jack with chains or
4. Come-along

MATERIALS AND SUPPLIES NEEDED

Timbers

INSTRUCTIONS

REMOVING DEAD OR UNWANTED TREES

(1) Remove dirt from around tree or stump with shovel.

(2) Cut tap roots and large fibrous roots.

(3) Place chains around stump or base of tree.

(4) Place parallel timbers on both sides of stump or base of tree.

(5) Place third timber across timbers 1 and 2 and as close to base as possible.

(6) Place jack on third timber and secure jack to chains.

(7) Using jack as hoist, lift out stump or tree.

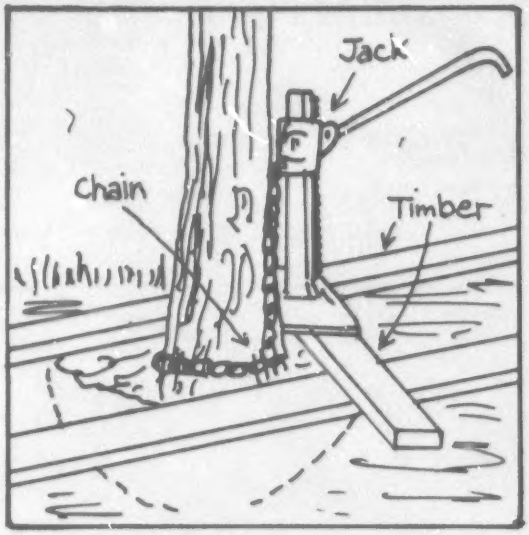


Figure 1. Using a jack to lift a stump.

STUDENT SELF-CHECK
DO NOT WRITE ON THIS SHEET

1. The best way to remove a live tree from the landscape is to cut the tree from the stump (3 ft. or 9 m above ground level) and let the stump die and rot for easy removal.

   True_____ False_____

2. The easiest way and safest way to remove a dead or unwanted tree is to simply pull it up with a tractor and cable.

   True_____ False_____

3. Before removing a tree, dirt should be shoveled away from the stump and all large roots should be cut.

   True_____ False_____

CORRECT RESPONSES

1. False 2. False 3. True

CHECK-OUT ACTIVITIES

The statement below explains the activity you must be able to complete in order to finish this learning activity package. As you go through this activity, your instructor will rate your performance using the Instructor's Final Checklist.

Remove a tree so that no portion of the trunk remains in the ground.

DO NOT WRITE ON THIS SHEET

LAP 42

Student _____

Date _____

REMOVING DEAD OR UNWANTED TREES
Instructor's Final Checklist

Check the student's performance in the following elements of removing dead or unwanted trees.

Place an X in the appropriate box indicating not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, the item was impossible to complete, place an X in the "Not Applicable" box.

Performance Level: All items must receive a rating of FULLY ACCOMPLISHED (or Not Applicable). If any items are rated Not Accomplished or Partially Accomplished, the student and instructor will discuss this and decide which learning activities must be repeated.

	Student Performance			
	Not Applicable	Not Accomplished	Partially Accomplished	Fully Accomplished
1. Removed dirt from around the tree or stump with a shovel.	[ ]	[ ]	[ ]	[ ]
2. Cut tap roots and large fibrous roots.	[ ]	[ ]	[ ]	[ ]
3. Placed chains and timbers correctly for hoisting stump from ground.	[ ]	[ ]	[ ]	[ ]

REFERENCES

BOOKS

Agricultural Cooperative Training, Vocational Agriculture – Horticultural Occupations. Vocational Instructional Service, Texas A & M University, College Station, Texas.

An Introduction to Agricultural Business and Industry, 3rd ed., Weyant, Hoover, McClay, The Interstate Printers and Publishers, Inc., Danville, Il., 1971.

Apply Pesticides Correctly – A Guide for Commercial Applicators, USDA and US Environmental Protection Agency, Washington, D.C.

Applying Pesticides, American Association for Vocational Instructional Materials (AAVIM) Athens, Ga., 1976.

Approved Practices in Beautifying the Home Grounds. Hoover, Norman, The Interstate Printers and Publishers, Danville, Illinois, 1966, 3rd edition.

Automotive Refinishing – Principles and Techniques, Hubson, W.T., E.I. duPont de Nemours and Co. Inc., Refinishing Division, Wilmington, Delaware, 1971.

Ball Red Book, 13th ed., George J. Ball, Inc., Box 335, West Chicago, Il. 61985, 1975.

Briggs and Stratton Repair Instructions III. Briggs and Stratton Corporation, Milwaukee, Wisconsin.

Fertilizing Farm Crops, Vol. 13, S.C. Department of Education, Columbia, S.C. 29201, 1961.

Fundamentals of Horticulture, Edmond, et. al., McGraw-Hill Book Company, New York, 1975.

Fundamentals of Machine Operation – Crop Chemicals, Deere and Company, Moline, Il., 1976.

Garden Magic – The Complete Illustrated Book of – Biles, Roy E., J.G. Ferguson Publishing Company, Chicago, 1969.

Greenhouse Flower and Bedding Plants for Agribusiness Studies, Williams, G.S., The Interstate Printers and Publishers, Danville, Il., 1975.

Groundskeeping Equipment, Volume I, American Association for Vocational Instructional Materials (AAVIM), Athens Ga.

Grounds Maintenance Handbook, 2nd and 3rd ed., H.S. Conover, McGraw-Hill Book Company, Inc., New York, 1958, 1977.

Handbook on Soils, Volume 12, No. 1 of Plants and Gardens, Brooklyn Botanic Garden, 1000 Washington Ave., New York, New York 11225, 1966.

How to Grow Annuals, Sunset Books, Lane Magazine and Book Company, Menlo Park, CA., 94025.

Implement and Tractor Shop Service (T & I Manuals), Technical Publications Division of the Interstate Publishing Corporation, Overland Park, CA.

Books (continued)

Landscape Maintenance, Wilson, Scott, Vocational Education Productions, California State Polytechnic College, San Luis Obispo, CA, 1969.

Landscape Maintenance and Establishment – A Student Handbook, Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania, 1969.

Landscaping the Home and School Grounds, South Carolina State Department of Vocational Education, Vocational Education Media Center, Clemson University, Clemson, S.C., 1970.

Maintaining The Home Lighting and Wiring System. American Association of Vocational Instructional Materials, Athens, Georgia.

Mechanics in Agriculture, Phipps, Lloyd J., The Interstate Printers and Publishers, Inc., Danville, Illinois, 1977 ed.

New Illustrated Encyclopedia of Gardening, Greystone Press, 225 Park Avenue South, New York, New York 10003, 1967.

Nursery Management, Volume I, Vocational Education Productions, California State Polytechnic College, San Luis Obispo, California.

Nursery Production and Landscape Maintenance – A Student Handbook. Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania, 1968.

Ornamental Horticulture – A Two-Year High School Course in Vocational Agriculture. The Vocational Education Media Center, The State Department of Education, Columbia, South Carolina, 1965.

Ornamental Horticulture, Gary L. McDaniel, Reston Publishing Company, Reston, Va., 1979.

Soil Classification and Treatment, South Carolina Department of Vocational Education. Vocational Education Media Center, Clemson University, Clemson, S.C. 29631, 1976.

Soils – An Introduction to Soils and Plant Growth, Roy L. Donahue, Prentice Hall Inc., Englewood Cliffs, N.J., 1965.

Tractor Maintenance Principles and Procedures, American Association for Vocational Instructional Materials, (AAVIM), Athens Georgia.

Tractor Operation and Daily Care, American Association for Vocational Instructional Materials (AAVIM) Athens, Georgia.

Turf Management Handbook, 2nd ed., Howard B. Sprague, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1976.

Turfgrass Maintenance and Establishment – A Student Handbook, The Pennsylvania State University, University Park, Pennsylvania, 1968.

BULLETINS AND CIRCULARS

"Care of Ornamental Plants," Circular EC 430, Clemson University Extension Service, Clemson, S.C.

"Care of Shrubs and Trees," Circular 430, Clemson University Extension Service, Clemson, S.C., 1978.

"Cool Season Grasses for South Carolina Piedmont Lawns," Circular 528, Clemson University Extension Service, Clemson, S.C. 29631, 1978.

"Fertilizer Recommendations for South Carolina," Circular 476, Clemson University Extension Service, Clemson, S.C. 29631 (current edition).

"Flowering Annuals for South Carolina," Circular 546, Clemson University Extension Service, Clemson, S.C. 29631, 1974.

"Insects and Diseases of Ornamentals," Circular 502, Clemson University Extension Service, Clemson, S.C., 1972.

"Warm Season Lawn Grasses for South Carolina," Circular 547, Clemson University Extension Service, Clemson, S.C. 29631, 1978.